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An Address.[1]

By ALAN PRYDE,

President of the Tasmanian Branch of the British Medical Association.

IT is a custom, and a very good one, for the President of this Branch upon his retirement from office to review the important recent events of the medical world, more particularly as they affect the Branch.

This has been an exceptionally stirring year for the Branch, and members generally have evinced a considerably larger interest in its affairs. The main reason has been the Government's suggested scheme of State medical services. As the Branch is still in negotiation with the Premier and the whole matter is still in the melting pot, I feel that any public comment of mine at this stage would be most unwise.

The Government is assured of our sympathy in its effort to improve the medical services in the outlying districts of the State.

Instead, therefore, of reviewing the last twelve months of Tasmanian medicine, I have enlarged my outlook. I intend to review the last twenty-two years, to compare the practice of medicine then and now, and to add some constructive criticism for the future. Here let me emphasize my belief that private practice generally in Tasmania will not undergo any great changes as the result of Government policy for many years. I would remind you that my remarks throughout are to be considered purely from a Tasmanian aspect.

[1] President's address, delivered at the annual meeting of the Tasmanian Branch of the British Medical Association on March 5, 1938.

Special Tasmanian Conditions.

We have special conditions here that do not apply to the other States. They are: (i) a small population, with a necessarily limited number of cases; (ii) absence of a large medical centre, with its associated hospitals and teaching schools; (iii) isolation geographically from the bigger medical centres.

If we consider first the small population, it is obvious that with a comparatively small series of cases of one kind a man cannot limit his study and practice to one subject. He cannot perfect his technique in a particular operation to the same extent as one who in a large centre more or less confines himself to that operation. For this reason specialism in its extreme form has not developed.

Secondly, the absence of teaching schools has meant the absence of that dogmatism necessary in a teaching centre. (A rather interesting corollary of this fact is our enjoyment of the dogmatic type of lecturer in our post-graduate courses here.)

Thirdly, the geographical isolation has tended to the development of an individual responsibility.

But more of this later. You will see now what I am driving at. The practice of medicine in Tasmania has largely been in the hands of general practitioners, who could not be specialists, who must needs think for themselves, who must act on their own initiative. I am neither praising nor condemning this necessity. While this still generally holds true, in recent years some of the younger men are limiting their fields of work and confining themselves to one or more branches that they favour. Indeed, of the honorary surgical staff of the Launceston Public Hospital I am the only "pure" general practitioner, and I think that in all probability I shall be the last.

Nevertheless, the bulk of medical practice in Tasmania is still done by general practitioners, and as one of that group and from that viewpoint I am making this address.

Looking Back.

Just a little under twenty-two years ago I commenced my Tasmanian practice of medicine as assistant house surgeon at the Launceston General Hospital. Except for a period of some five years I have spent my medical life in this island.

What was medical practice in Tasmania like twenty-two years ago—nearly a quarter of a century?

As I look back, my impression is decidedly favourable. The standard in the cities compared well with that of the mainland. That this was due to a small handful of particularly capable men I am well aware. I am very glad to say we have with us still one or two of that eminent number.

The standard in the country generally at that time was, I think, lower than in the cities. This was possibly largely due to the depletion of the ranks of the general practitioner from war service. It is gratifying to be able to state that, again speaking generally, this comparison is now quite unwarranted.

While, then, my impression of comparative standards is a happy one, medicine and surgery have made such enormous strides during this period that we must ask ourselves if we have kept in step.

I think my generation is a fortunate one, in that we have had a place in the ranks for this momentous march. We are the connecting link between pre-war and present-day medicine. We were just old enough to have taken our part in that period and yet not too old to be able to appreciate what the intervening years have added. We have the advantage of being able to compare the new and the old, to be just a little critical of new enthusiasms and perhaps to hold a more just balance therefore.

Medicine.

You will remember that insulin was as yet undiscovered, but Allen had almost revolutionized the treatment of diabetes by his method of starvation and carbohydrate-free diet. I can still remember the thrill of finding the heavily laden urine becoming quite sugar-free in two, three and four days. Since the discovery of insulin the treatment of diabetes has followed the course of that enthusiastic pendulum that takes all new treatments in its swing. It has now become more or less stabilized, insulin being reserved for the more severe types of diabetes and its emergencies—and what a godsend in those emergencies!

The surgeon can confidently consider a major procedure; the obstetrician can consider almost as confidently, though very much more harassedly, a pregnancy; each with its happy outcome entirely due to insulin.

Pernicious anæmia took toll of our best citizens, and we stood by helpless, able but to prolong their lives slightly with blood transfusions. The miraculous results of liver treatment seemed almost too easy to me, and I am still looking for the "catch" in it. The later generation accepts it as quite an ordinary affair; perhaps it is right, but it has missed the vision of the miracle.

Twenty-two years ago we were still surveying another marvel—syphilis had just received its first tremendous set-back by the introduction of "Salvarsan". We were still seeing gummata and other tertiary manifestations, which seem rare today, but which are unforgettable to our generation. I still have the feeling that the dragon is but asleep. Positive Wassermann reactions crop up in most unexpected places. The old teaching that included syphilis in every differential diagnosis cannot be discarded.

Less dramatic, but very fascinating, has been the development of organo-therapy. Thyreoid gland we used, and saw its quite dramatic effects in gross myxœdema, again a rarity in these days. Pituitary gland extract was in use, but its subdivision into anterior and posterior products was unknown. The introduction of anterior pituitary-like substance has

given us a potent weapon in the treatment of undescended testicle.

The numerous ovarian preparations are, I now believe, active when given hypodermically. I was very sceptical of their effects until the last year or two, but I believe they will soon be serving us usefully if used intelligently.

Surgery.

If medicine has had its miracles, what of surgery?

As a matter of fact, surgery in Tasmania twenty-two years ago, in a few hands and in some of its aspects, was of such a high standard that we have to look to its sub-branches for any dramatic changes. For instance, I doubt whether the technique of thyreoidectomy has improved, but the use of pre-operative iodine and gas anæsthesia have converted the desperate cases into good risks.

Pre-operative iodine medication in Graves's disease is one of the outstanding surgical events of this period and, I think, the most important single factor in the treatment. The exceeding importance of withholding iodine until the pre-operative stage cannot be too strongly stressed. The optimum time of operation some ten days after the commencement of iodine therapy comes only once. The temptation to "try out" the effect of iodine in a case of goitre must be resisted. The only exception is the goitre of puberty.

Surgery of the chest has made great advances, largely owing to the intratracheal method of inducing anæsthesia. Hydatid cysts of the lung can be blown up to the chest wall and the operation made comparatively simple.

I do not know if a lobectomy has been performed in Tasmania.

Fractures.

It is in the treatment of fractures that dramatic changes have taken place, and fortunately we have been able to share in this branch of surgery.

As a fifth-year student I was very carefully instructed in the application of the long Liston splint for fracture of the shaft of the femur. Those of you who remember this crude splint will also remember the inverted feet of the end result. I think it must have been this splint that stimulated Hamilton Russell in his muscle rest observations. It certainly had all the opposite attributes. However, Hamilton Russell's method of treating fractures of the shaft of the femur was the first ease to my troubled mind.

Fractures of the shaft of the tibia were a sore trial to us twenty-two years ago. We used to put limbs up in extension by means of adhesive tape, which continually slipped. The end results were ugly, lumpy unions; bone plating and bone grafting were justifiably and successfully performed. Today the moulded, unpadded plaster splint has made this fracture one with which the house surgeon deals as a matter of course. Extension by means of Kirschner's apparatus has made possible good results in all sorts of difficult fractures.

I am particularly delighted with the unpadded plaster splint. Trained to use thick padding before applying plaster, it was with amazement I first saw plaster "mud" applied to the bare skin. I would heartily commend to any of you who may possibly not be conversant with the method, this quite delightful form of splinting.

Obstetrics.

The science of obstetrics has not lagged behind in the general progress. It has, indeed, attained the dignity of a science. The laboratory is now its handmaiden, with its blood chemistry analysis in kidney dysfunction, its Aschheim-Zondek and other tests for pregnancy, its use of vitamin *E* in habitual abortion, to mention but some of its aids.

Ante-natal supervision has become more elaborate and more general. Patients with albuminuria, in which there has been an extraordinary increase in the north in the last two years, have been discovered early and generally successfully treated, as regards both mother and infant.

Analgesia and amnesia in labour are the outstanding events in obstetrics, in my opinion. Various drugs, of which I place hyoscine first, and combinations of drugs are used. By suitable dosage and method analgesia and amnesia can be secured in all cases, naturally more satisfactorily in some than in others. By the effective use of hyoscine in reducing interference to a minimum, hundreds of babies that would otherwise have been stillborn have been brought into the world, not only alive, but uninjured. By its beneficent use even more mothers have had an uneventful puerperium. It has transformed the management of labour, and without it I for one would not be an obstetrician.

X Rays and Radium.

What an extraordinary change has occurred in that adjunct to medicine, the use of X rays and radium. Twenty-two years ago good types of plants were doing extremely useful work, but they were limited practically to diagnosis in the skeletal and gastro-intestinal tracts. Since then cholecystography and pyelography, extraordinarily intriguing upon their introduction, have become routine methods. Ventriculography and encephalography have become accepted practices. But the science of radiology is now too extensive even to tabulate, and must soon develop specialties within the specialty. Radium and deep X ray therapy are examples of this.

Where the X ray work of the Launceston Public Hospital used to be done by the superintendent, we have now a department with a part-time radiologist, a full-time physicist and full-time technician, a sister technician and a consulting physicist. In addition, a resident medical officer and a typist are attached as part-time assistants.

We have had for some seven years a "radium clinic" with full records and resultant valuable knowledge of the response of several types of "local" cancer to the action of radium. The deep therapy plant, an extravaganza too overwhelming for me to

comprehend completely, has been in use for some months. This briefly reminds you of some of the aspects of this allied science, and serves to emphasize the absolute necessity for specialism in it. We must have at least one fully trained radiologist in the north and in the south, men to whom physician and surgeon can confidently go for advice and assistance.

Anæsthesia.

The development of gas anæsthesia, improvement in the type of apparatus, and particularly the introduction of ethylene, have placed the administration of anæsthetics among the specialties. We have among us men thoroughly versed in this technique, and I do not know what we should do without them in the difficult cases. I sometimes think they would appreciate a leavening of easy ones.

The Future.

I stated earlier that most of the work in Tasmania was done by general practitioners, with a sprinkling of men with special interests.

What of the future?

Let me remind you of the special Tasmanian conditions.

Our comparatively small population will always be a deterrent to extensive specialism. Nevertheless, it is desirable, indeed essential, that some degree of specialism should be developed. As I have indicated, there are already a number of men with special qualifications who have shown their desire in this direction. Specialist eye service is well established in the south and in the north. The ear, nose and throat specialty has long flourished in the south and is developing in the north. We are grateful to these men.

However, there are quite a number of other directions in which men are showing their keenness, and it is our duty to encourage them. It is our duty to our patients to give them the best possible attention, and here is an opportunity. By using the knowledge and skill of these men we shall all be the gainers.

We have several men confining themselves to medicine, one at least in particular to diseases of the heart, another to psychiatry. We congratulate ourselves upon this, realizing how impossible it is for the general practitioner to keep abreast in these special subjects.

To surgery also a small number of men have successfully limited themselves. In this branch of medicine the small population prohibits specialism within the specialty. However, though all must be general surgeons in the wide sense, certain of them have shown a leaning towards special procedures.

Here I suggest a promising path of progress. If all cases of a special type are diverted to one or two men, the disability of a small population will be somewhat overcome. These men will have an opportunity to perfect themselves in this particular subbranch of surgery. I am thinking, for example, of orthopædic and genito-urinary surgery.

I would commend this suggestion to all members of the association.

Fee-Splitting.

Fee-splitting is an abomination, if for no other reason than that it reduces the gentle (Oxford Dictionary definition: "Belonging to the class of gentlemen") art of surgery to that of a third-rate business proposition. However, I do think some ethical means could be devised whereby the general practitioner would receive for his services as anæsthetist or assistant or after-care attendant a more generous proportion of the total fee. This, I am sure, would diminish the number of graver cases in which operation is performed by general practitioners, to the benefit of our patients and of our own consciences.

I think this applies particularly to Tasmania, where the majority of the general practitioner class are well fitted for this type of work.

Post-Graduate Courses.

The second condition peculiar to Tasmanian medicine, the absence of a medical school and of teaching hospitals, is also not likely to undergo alteration for many years.

To reduce this disability in some little degree we have established regular post-graduate courses, twice a year, and have been very fortunate in obtaining the cheerful help of leading physicians and surgeons of the mainland, all of them teachers in their medical schools. We cannot overstate our gratitude to these gentlemen.

While attendances at these courses have been highly satisfactory, I have been forcibly struck by the fact of the same men attending time after time. This is the best sign of their satisfaction, but we should like to see some new faces as well. Most of the subjects dealt with are eminently suitable for the general practitioner. In addition, the Tasmanian section of the Royal Australasian College of Surgeons holds an annual meeting, to which we are all invited. For this also we are deeply grateful.

So, though this second peculiar condition may do good in that we needs must think for ourselves, let us at least keep the sword of our thoughts burnished by repeated "brushings up".

Conclusion.

The third disability—yes, I am acknowledging it—of geographic isolation is the only one that in the near future will be lessened.

Already the straits telephone has brought us into close touch with consultants on the mainland.

Air travel has made possible urgent visits to and from them.

All these facilities will doubtless be much more extended in the future, and will mean enormous benefit to the standard of practice in Tasmania.

I am optimistic of the future of medicine in this State. We have no cause for shame in the past, and our present standard is good. My suggestions for the future I leave to your thoughtful consideration.

MATERNITY AND SOME OF ITS PROBLEMS.[1]

By H. S. McLelland, M.B., Ch.M., F.R.A.C.S.,
Honorary Gynæcologist to the Brisbane Hospital, Brisbane.

The vague and comprehensive title of this paper is intended to justify me in presenting a rather incongruous address, embracing not very closely related matters which have interested me during the past year. I wish, therefore, to include nutrition in pregnancy and lactation with reference to the toxæmias and anæmias, and a consideration of two destructive social evils, improper contraception and abortion.

An Adequate and Balanced Diet.

The literature of the newer knowledge of nutrition is remarkable alike for its volume and its interest. It combines all the qualities of documentary truth, and if we include the outpouring of the vast horde of camp followers of our own professional army, all the fantasies of fiction. There are heroes aplenty like the great McCarrison, and the too-successful quack vendor of fancy goods fulfils admirably the rôle of rich and arrogant villain.

Since about August, 1936, the Queensland Nutrition Council has issued many thousands of leaflets to the members of our association entitled "Adequate Nutrition during Pregnancy and Nursing". If every expectant mother who received this leaflet had been able to follow out its instructions, there would have been few women confined in the last year who had not had an excellent diet. This is very far from being the case, however.

The advice given is the following:

Your daily diet should include:

- Milk. One and a half to two pints.
- Four ounces of meat (including fish, liver and kidney, and brains).
- One egg.
- One ounce of cheese.
- Two ounces of butter.
- Eight ounces of potatoes.
- Three ounces of raw lettuce or cooked cabbage.
- Four pieces of fresh raw fruit daily.
- A helping of two other vegetables not included in above.
- As accessory foods, wholemeal or wheat germ bread, whole wheat breakfast meal varied with oatmeal porridge.

Foods containing much sugar or white flour should be avoided or much reduced.

Let us consider this diet in relation to clinical and laboratory experience. McCarrison has pointed out that the diet of the Sikhs has stood all the practical tests. This consists of abundance of milk and whole cereal, supplemented when possible by meat and leafy vegetables. The hardy Sikhs and successful Scots are evidence that milk and whole cereal are a good basis for a sufficient diet. Many thousands of laboratory experiments support this belief. When the basis of milk and whole cereal is built up by supplementary foods, it is essential that the balance be maintained. The addition of excessive amounts of protein may disturb the balance and cause disease, but much protein may be added if balanced by the addition of fruits and vegetables. If you consider this diet as based on milk and whole wheat (bread and breakfast meal), you will see that the proportions of protein, carbohydrate and fat are kept and that there is abundance of vitamins and minerals and also a balance of acid ash and alkali ash.

Let us consider just one series of experiments to illustrate the startling results of an imbalance, experiments which may have some bearing on the toxæmias of pregnancy. V. H. Mottram[1] demonstrated the effects on suckling rats of an unbalanced diet given to the mother rat. Results are of course not precisely comparable to clinical experience; a week in the growth of a rat is a year in the growth of an infant, so that effects seen in one week in the rat are what might be expected in a much longer time in the human infant. Mottram found that bread and meat provided a diet on which the mother rat kept well and was able to nourish her young. This was not an optimum diet, but it sufficed. When, however, a considerable amount of meat was added to the diet of the mother the suckling rapidly lost weight and died in convulsions in about one week. He found that when this unbalanced diet was further supplemented by tomato juice the sucklings were protected and continued to progress.

It is probable that the extra protein required for its use so much vitamin *B* complex that none was left for the milk secreted.

Sure,[5] in America, carried out somewhat similar experiments with similar results, his object being to ascertain the vitamin *B* requirements for successful lactation. When the sucklings commence to fail they may be rescued by the administration of vitamin *B* either to the mother or to themselves.

It is now generally believed that the vitamin *B* content of either human or cow's milk alone may not always suffice for the growth and well-being of the suckling. Shortcomings are recognized by the appearance of symptoms varying from loss of appetite and failure to gain weight to the manifestation of a more definite syndrome.

The relation of vitamin *B* complex to the metabolism of protein may have a bearing on the toxæmias of pregnancy. Many investigations have been carried out in regard to nitrogen balance in pregnancy. It must be obvious that the demands of the fœtus alone mean a high nitrogen retention. It is found that a high nitrogen retention is favoured by a high protein intake, supplemented by abundance of the vitamin *B* complex in the food.

Toxæmias of Pregnancy.

It is known that a degree of hydræmia is normal in pregnancy, the blood volume being increased about 20% or even 25%. It is known too that there is normally some decrease in the ratio of serum albumin to serum globulin. In 1935 Strauss[4] investigated a number of cases of toxæmia of pregnancy. He found as a general rule that in toxæmic cases there was a decrease in the serum albumin. In non-toxæmic cases the serum albumin maintained a higher average figure in patients who had a good diet than in those who had a poor diet. In toxæmic cases the serum

[1] Read at a meeting of the Queensland Branch of the British Medical Association on February 4, 1938.

albumin was most reduced in the eclamptic cases. These variations were found not to be due to hydræmia alone, for the serum globulin is very much the same in all cases. There is a wide variation, however, in the serum albumin content of the blood in normal pregnancy; but the great majority of patients with serum albumin less than 3·25% are toxæmic. The loss of albumin in the urine is not a decisive factor, as many patients have no albuminuria. The reduction in plasma albumin results in a lowering of osmotic pressure, a decrease which can be calculated and which favours the production of œdema.

Strauss also treated a number of patients by administration of a very high protein diet, including a large ration of raw liver supplemented by an abundance of vitamin *B* complex. Results were extraordinarily good, especially when compared with control patients treated by a high carbohydrate diet. It has to be remembered that patients with a taint of nephritis or hypertension were excluded from this investigation, only patients known to have been normal before pregnancy being accepted.

Referring again to the diet sheet you will see that it is a high protein diet containing a sufficiency of vitamin *B*. My own experience in the last two years leads me to favour greatly this type of diet for pregnancy and lactation. I believe it reduces the incidence of toxæmia of pregnancy. It must be remembered, of course, that toxæmia of pregnancy is meant to include only those cases which are normal at the beginning of pregnancy. It has to be recorded, however, that McCarrison has forecasted that this diet will be found to be too high in protein.

Gain of Weight in Pregnancy.

The gain of weight during pregnancy varies widely within normal limits. Normal limits have been held to be between sixteen and thirty-two pounds. The gain of weight in toxæmia is greater, and a rise of more than four pounds a month suggests the possibility of an incipient toxæmia. There are cases, however, in which the gain of weight, with obvious œdema, is much greater and which cannot be regarded as toxæmic, though they have features in common with toxæmia of pregnancy.

Case History.

Mrs. M., aged twenty-eight years, a *primipara*, was confined on January 10, 1938. Her weight was 136 pounds at the commencement of pregnancy, 198 pounds at full term (a gain of 62 pounds), and 165 pounds two weeks after confinement (a loss of 33 pounds). The urine was never found to contain albumin or sugar. The hæmoglobin value of her blood was 97% at mid-term, falling to 88% at full term (100% = 14 grammes per 100 cubic centimetres of blood). The serum albumin was 3·15% at full term. The systolic blood pressure was 136 millimetres of mercury, and the diastolic blood pressure varied from 88 to 94 millimetres of mercury. There was obvious œdema of the feet and ankles. Slight œdema of the hands was present during the last two months of pregnancy. There were no symptoms except the œdema. The patient was very well and active.

There was a light loss of blood *per vaginam* at two months' gestation. This was regarded as a threatened abortion. The patient was given a tablespoon of raw wheat germ three times daily for about two months, also 0·5 milligramme of "Proluton" daily for three days and one cubic centimetre daily of "Antuitrin S" for ten days.

There is undoubtedly a relation between threatened abortion, spontaneous abortion and habitual abortion on the one hand and the toxæmias of pregnancy on the other hand. There is a high incidence of toxæmia in cases of threatened abortion in which miscarriage is prevented. There is also a high incidence of toxæmia in women who are prone to abortion but who have been enabled to carry on to full term by the administration of wheat germ, rich in vitamin *E*, or by anterior pituitary hormone.

It seems that toxæmia of pregnancy is a deficiency disease due to the failure to absorb and elaborate some accessory food product or products, the function of which may be to assist in the development of the *corpus luteum* early in pregnancy and of the placenta later. A high protein diet, which is rich in accessory food substances, appears to prevent many toxæmias and to mitigate those which are not entirely prevented.

The Anæmias of Pregnancy.

The greatest incidence of anæmia is in women of the fertile age and in infants of less than one year. It is generally believed, though not yet proven, that anæmias of women and of infants are related. The developing fœtus has to draw on the mother for iron and other blood-forming elements. Not only must its own body be built up, but it must store enough iron for its milk-fed life, as human milk contains little iron and cow's milk less.

In considering the anæmias of pregnancy it is necessary to bear in mind the peculiar behaviour of the hæmoglobin values as pregnancy advances. There is normally a fall of about 7% to 10% from mid-term to the end of thirty-six weeks. The reason for this is the hydræmia of pregnancy, which is also progressive and may normally be a 20% or 25% increase in blood volume. There is also an increase of total hæmoglobin of about 15% to 20%. Compounding these factors, it is apparent that the hæmoglobin value falls a little.

Fullarton[2] gives a graph of hæmoglobin values founded on an investigation of a large number of patients considered normal. This graph shows the hæmoglobin value at 83% at mid-term, falling to 74% at the thirty-sixth week and rising slightly in the last month. His patients were taken from the public hospital class. Jocelyn Moore and E. Pitt Williams[3] give a chart compiled after an examination of patients, none of whom were in really poor circumstances, and who were able to have a "controlled good diet". The hæmoglobin value is given as about 87% at mid-term, falling to 80% in the thirty-sixth week and rising slightly in the last month of pregnancy. These workers also demonstrated that the hæmoglobin value could be maintained at 85% or better by the administration of iron.

For the practitioner who has not laboratory facilities for all his patients, the hæmoglobin value should be a regular routine and periodic examination. If a good type of hæmoglobinometer is not available the Tallquist scale is very useful.

In this community the anæmias of pregnancy are mostly of the microcytic type. There are a few cases of the macrocytic type, however. Microcytic anæmia in pregnancy is a deficiency disease and the deficient

substance is iron. In food, iron exists in the ferric state, and for its absorption it must be reduced to the ferrous state. This reduction occurs to some extent in the digestive tract, in the presence of acid and in the absence of nascent oxygen. For absorption, iron must be soluble, ionisable and ultrafiltrable. In abnormal conditions it is possible, therefore, that absorption of iron may not be enough for the bodily needs. There is a tendency to hypochlorhydria in the whole term of pregnancy, and in the first trimester there is occasionally a temporary achlorhydria. There is, therefore, a tendency towards conditions which do not favour the absorption of iron. Fortunately the metabolism of iron in the body is conservative, and not much is lost again after absorption.

It would be hard to assess the damage of neglect of minor degrees of anæmia in women, especially in pregnancy. Not only does the patient not easily recover (there is admittedly a tendency to recover), but the infant born of an anæmic mother is likely to develop anæmia during the first few months of its life, though it is almost invariably born with a normal blood picture.

Disease of Psychic Origin.

Psychic factors, as causes of morbid symptoms, are of much greater significance in the life of a woman than in the life of a man. Apart from the more intricate mechanism of woman's body and functions, there is always another possible cause of unhappiness which may lead to a train of unpleasant symptoms: that is woman's complete and permanent dependence on man for the realization of her natural destiny. The doctor must not for one moment forget this dependence in his care of his women patients. Experience and patience are necessary for the discovery of the origin of symptoms in individual cases, and for those who have not had time to gather the experience a ready-made theory will fit a large proportion of cases. It is in this case not "*cherchez la femme*", but "*cherchez l'homme*".

Such symptoms as leucorrhœa, pruritus, frigidity and dyspareunia, vaginismus, dysmenorrhœa, amenorrhœa, trigonitis, and vomiting in pregnancy are often psychopathic and most often present in women who are in some way "inadequate"; but they may be due to the default or incompetence, perhaps by ignorance only, of a husband or lover.

When one comes to consider the causes of symptoms of psychic origin, related to the woman's sexual and dependent life, one finds that those causes are fewer and less varied than the effects they produce. Woman's dependence on man, in her sex life, frequently spells insecurity for her, which at certain times and in certain situations has a very serious effect on her mental outlook. One sees this often in the first month or two of pregnancy, and perhaps more often still in the unmarried woman with a sexual life and experience.

Another factor of great importance is the fear, often only subconscious, of sterility. The nervous symptoms of the climacteric and the "jitters" of the hyposexual woman are often traceable to this cause. This fear of sterility is a fundamental part of woman's nature, and is seldom entirely absent from the woman who has not yet borne a family, though it may appear to have been suppressed by other influences. You may not easily admit that some of the psychoses of the climacteric are due to the thought that this is the passing of the fertile age, but you must admit that the successful mother is little troubled at that time.

It is not very difficult to test for the presence of the fear of sterility. Consider the case of the bride who consults you for contraceptive advice. I think we are all agreed that the newly married woman, if healthy, is not a proper subject for contraception. Your problem, then, is not what kind of contraceptive you will prescribe, but how to change the young woman's point of view. A tactless sermon may send her to the vendor of contraceptive goods. However, as she has probably never yet considered the possibility that she may not even be fertile, this consideration should be suggested to her. Is she fully developed sexually? Is she sure that she will be able to conceive and bear children? How can she possibly be sure yet that she will ever have a family? Is she not anxious to know these very important things? It usually becomes apparent that the young woman is not so very keen for contraception after all. She may have wanted to prolong a little the romance of the honeymoon. More often the husband is the culprit.

Paradoxically, the fear of pregnancy is also a cause of unpleasant symptoms, a fear which may be accentuated as the climacteric approaches. However, this fear is secondary either to the consciousness of insecurity or to physical unfitness. Jealousy is, no doubt, the best known and perhaps the most potent cause of symptoms, and as everyone knows it is the *matière première* of the joke factory; but it is no joke for the doctor who has to dress the wounds inflicted by the green-eyed monster.

The mental conflict which arises when a young woman is under the spell of two irreconcilable influences frequently brings in the physician. I am not thinking of the eternal triangle of the story writers so much as another triangle (with one very acute angle) composed by the woman, her mother, and her husband. One occasionally meets the young woman whose love for her mother has become fixed and frozen, as it were, in a state that is normal to a child of ten years old. It is not so much love as complete dependence, and the mother's feeling for the daughter is less one of love than of jealous ownership. Marriage, love for and dependence on a husband normally bring the cure, but not in every case. There is the woman who has gained an hypnotic possession of her daughter's mind, and relishing her power, uses it ignorantly, selfishly and destructively. There are, of course, many other types of mental conflict.

One has to remember that a woman is not often happy working for herself alone or for a cause alone. She is happier working for an individual. Of course there are brilliant exceptions to this generalization, but when a woman appears to be working sedulously for a cause you may find that the cause itself contains the individual. Remove him or her from the cause

and your zealot is discouraged, lazy, then unhappy and finally sick. More are sick because they are unhappy than are unhappy because they are sick. Indeed, her own sickness is not a major first cause of woman's unhappiness.

You will have noticed that the psychiatrist seeks to become a physician and that a physician aims to acquire the mysterious knowledge and practice of the psychiatrist! Alas! it means that there are problems in our practices that neither physician nor psychiatrist solves easily. It has to be recognized that many of these women with symptoms of psychic origin are "inadequate individuals" who become adequate temporarily while under the spell of their doctor dispensing chivalry in large doses—a chivalry which may be just another of his sedative mixtures, and habit-forming at that! The *religieuse* will tell you that there are only two states for a woman, the religious state and the married state, meaning motherhood. Yet surely the whole truth is that there is only one state for man or woman, and that is the triumphant state. Man must win it and woman must be given it.

Contraception and Abortion.

No statistical inquiry into abortion, such as was carried out in other States and in New Zealand, has been made in Queensland. The truth is obvious nevertheless. This community is guilty on two very serious counts, improper contraception and criminal abortion. It is well enough known that our profession has stood its ground in combating the evils when others have given way. The problems which these things have raised, however, lie very close to our conscience, and it is obvious to those who know anything about them that the solution depends on what success can be won in the wide field of education of our people. Our consideration of the state of the society in which we live, at work and at play, correlated with the knowledge gained in our offices and hospitals, makes it apparent that the field is very wide indeed and that the remedy lies beyond the power and scope of the doctor unaided. We are, however, by virtue of the greater knowledge we have in these matters, fitted to initiate and to a great extent to direct an educational effort. As a first step it seems essential to assemble our knowledge and to arrive at some degree of unity and unanimity, for though politicians are expected to disagree and are even paid for it, differences of opinion among the members of our profession seem always to provoke mirth and a superior contempt.

It can be said that there is no disagreement on one vital point—abortion and intemperate contraception have ruined the health of many thousands of normally sound women and many who have regained some measure of health after an abortion have been permanently sterilized. It can be said also that the great majority of women who have been subjected to criminal abortion never regain their normal health. It can be said, too, that improper contraception for selfish ends is a destructive evil, followed by more or less severe sanctions. Do men know these things? Do they know what they are doing to their own women? It is clear that they do not and that they should learn the truth. There will be some disappointment, too, for in this age it has become a matter of very general experience, even amongst very young people, that sexual relations are highly pleasurable. There is, then, little cause for wonder at the success of those public enemies who live by selling the idea that contraception and abortion are safe.

I think there is a general agreement among us that both intemperate contraception and criminal abortion have destroyed and are destroying thousands of women. There is no such agreement, however, as to the cause of the prevalence of these evils. The doctor attempting to explain finds himself on the strange unexplored ground of economics and other sciences that are still in the nascent state. The rich man, it is said, will not be distracted from the enjoyment of his riches and the poor man cannot afford children. He who is neither rich nor poor picks whatever reasons suit his fancy. Consideration of many cases of family restriction forces one to believe that men have largely ceased to desire children and that the cause may well be that weak state of mind and body which follows a degenerate fixation on the pleasures of life and the corrupt enjoyment of sex. The high cost of living is of less consequence than the high cost of pleasure on the modern scale.

The first approach to the understanding of any problem such as this is best made by considering the last cause first. It is nearest and easiest to find. It must be apparent that the last cause, the precipitating cause, in every case of abortion, lies in the mind of a woman who seeks it or submits to it. Now, most of us know very well that a woman in sore trouble is not clearly conscious of what lies in her mind, and that her actions are often guided by an instinct which transcends reason or by a fear which paralyses it. In her extraconscious mind lies the judgement that man is failing her.

Man, the Defaulter.

Successful man, primitive or civilized, is a hunter who must build his house and bring home the venison. For his woman there is one supreme need, the security and protection which only her man can give if she is to bear him children. For his woman's health and happiness equally, there is need of children. One wonders what protection there can be for woman in a community such as ours, which allows its daughters to pay fares and buy drinks for their escorts. Can such young men be the bronze gods Australians fancy themselves to be?

Man's protection forsooth! The young women think so little of it today that many, very many, weak but prudent, seek to buy it from their chemist. There was a day when man desired children. It was good to be a patriarch. Today it is good enough to be a pensioner, and the popular philosophy is that of Walt Disney's grasshopper, "The world owes me a living".

A very marked deterioration has occurred in the status of men in most communities in the last few decades. Consider this sequence: votes for women no longer satisfied with men's rule; more jobs for the women with the votes; celibacy for women with

jobs; contraception for the celibate women, a wonderful and expanding market; abortion for the failures of contraception, another expanding market. It is a sequence which should be studied by the psychologist and historian rather than by the economist. Is it not that the feminist movement was a frank mutiny conditioned by man's failure in his primary duty of sustenance and protection of woman? And is not man failing because of his thraldom to a monster of his own creation—a civilization designed for his pleasure rather than for his good? Many a man today is in trouble because he has lost the right to be master in his house.

The Passing of Chivalry.

In every case of abortion procured for an unmarried woman there is this factor—a woman has been seduced and then abandoned. Some years ago there was a phrase we often heard: "Doing the right thing". It meant marriage and had a penitently honourable ring about it. We still hear these words in the same context, but they now have a very different meaning. They mean the finding of a few pounds to buy a shameful service, the cheap and dishonourable escape for the man. Our law courts, in which there resides a good deal of the wisdom of the ages, have a habit of assessing man's liabilities in hard cash. The figure applicable to a man who is responsible for a new life is, I believe, several hundreds of pounds spread over the years.

When a married woman seeks an abortion for a reason other than her medical unfitness, you can generally find in her case this factor, she has lost man's protection. Her husband is unable or unwilling to provide the security she must have. You can test the truth of this in your practice in a simple way. Borrow again from the lawyers and seek the facts as they would. First, take the evidence of the woman with patience and sympathy. Learn to recognize and discard the glib excuses suggested to her by the defaulting man; then take the man's evidence, and finally have your two witnesses together. The suggestion of a threat is sometimes necessary to obtain the man's presence. It is not a very heartening experience, the unmasking of men so degenerate that they have even forgotten how to strut in the presence of the female.

These considerations suggest a plan for us and a duty. The facts as we know them have to be brought to our people and particularly to the men. There is nothing safe or fair for women but virtue. Whatever may be the superficial appearances, and in spite of many exceptions, this is what women want and what men today do not want. It has to be said with enough detail to convince and perhaps with enough fine scorn for weak heads and weaker hearts to sting a dying pride into life again. It is vain to argue with betrayed women; nor is it sufficient to preach virtue to women, for if their chastity is worth nothing to man then it is worth nothing at all. With a wise people, the virtue of the daughter is the function of the mother, who has learned that the price of chastity is man's bidding. When again men demand that their brides be chaste, they will be chaste. So long as they continue to regard women as sophisticated givers of pleasure, so long will there be improper contraception and criminal abortion for the failure of contraception.

The Need for Education.

What shall we say of the abortionists—the monsters who live by a trade which combines the choicest qualities of blackmail and murder? It would not be too much to say that Jack the Ripper was no worse than these. Happily we know, and investigations prove, that with the exception of a very small number of degenerates, doctors and nurses have resisted the evils, and in the best possible way—by the education of their patients. More than this is expected of us, and there is more than a suggestion that we should perform a kind of police duty. We may do better if we extend our influence with our people and endeavour to teach more in matters which are of public concern and lie within our province. It must help if these abortionists are held up to the execration they deserve. They are not held in loathing; rather are they regarded as a not very respectable necessity for the corrupt element of the community, like the lie that is a present help in trouble. Indeed, the abortionists have a standing in the community. They have their public—likewise fixed habitations and names. It can be due only to the dangerous complacency of the public conscience that this trade flourishes—the order of the syringe, a vile brood of harpies living on the women they destroy.

It is obvious that our influence needs to be increased, and our scope should include education in matters that are our concern. Unhappily, our influence for good has been lessened, and it has given great satisfaction to the most guilty members of our community to see us publicly indicted in such fashion that our most worthy members are those who are most offended and discouraged. It has been balm to the guilty to be associated in this manner with honourable men and women, for their guilt appears less by the association. If any fault lies with us, it is that we have not been able to fulfil our mission as teachers. Yet it should be remembered that we are not trained to teach in a public way, and our experience in this duty is confined to the homes of our patients and our offices.

Doctors and the Rulers of Men.

It is obvious that we have need of more frequent and more friendly contact with governments. We have long sought to make the contact without success. We have still more need of cooperation with all who by their life and work are to be regarded as educationists. For too long we have had to find our inspiration in our own narrow circles. In politics and in the social life of our time there have been discouragement and disillusionment for all who would work for the public good. It seems at this moment that our rulers seek our counsel and our help; we hope it is not merely our dumb acquiescence that is to be demanded. Today, when our hospitals have nearly ousted the churches from the skyline and libraries do not exist, it is more true than ever that:

"Men come to build stately sooner than to garden finely, as if gardening were the greater perfection." It is painfully obvious that these stately buildings are dead things without the organized service which we are so anxious to render and which would give them life. One dares to hope that after so many years of labour there may be the birth of some living thing. It has always been incomprehensible to us that the government has given no consideration to the service which our association has outlined. It would find favour with the people. Does the government believe that what is by the doctors can only be for the doctors?

It is at least encouraging that so many are today sick of the miracle-mongering quacks and their preposterous claims. Yet the quacks will always be with us, and we can suffer them gladly, for they have few surprises for us. Always their product is born as soon as conceived and without travail. Always their nostrum is a revelation and becomes an article of faith and not of reason and not of experience. One never ceases to wonder at their success, though the reason is plain enough. It is their shining banner with the familiar device "*Vox populi, vox Dei*", a banner behind which the timid rulers of men are wont to march in hypnotic step. Yet our people are hungering for knowledge and truth. Their nature abhors the vacuum that is there. The signs are plain enough. The man in the street is, in his awkward way, a student and even a research worker, who understands the method of trial and error. The quack merely fills the vacuum that is partly of our making, erecting his ugly sign, as it were, on the vacant allotment.

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REFRACTOMETRY AND THE CONCENTRATION OF THE BILE.

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Clinical information on the subject of the concentration of gall-bladder bile is derived, firstly, from cholecystography, secondly, from examination of the bile obtained by means of the duodenal tube, and thirdly, by examination of the bile obtained at operation. While cholecystography may demonstrate a high concentration of the bile in a distended gall-bladder, nevertheless concentrated bile may be present in a partially collapsed gall-bladder without cholecystography being able to reveal its high concentration. Moreover, we have found that while X ray reports may have reference to very defective concentrating power of the gall-bladder, the actual examination of the bile removed at operation may show that the bile is extremely highly concentrated. It is possible that Anderson and Marxer's[1] oral method of cumulative cholecystography would obviate such errors.

It is advisable at each operation on the gall-bladder, whether it be cholecystectomy or cholecystotomy, to arrange for a determination of the actual concentration of the bile. The method we recommend for carrying out this check is refractometry. It is apparently unusual for any quantitative estimation of the concentration of the bile obtained at operation to be made. Many still hold that there is no effective chemical method to estimate the bile salt correctly, while the determination of the specific gravity of the bile, because of its viscosity and small quantity, would probably involve a protracted weighing operation. The result is that the surgeon usually contents himself with the naked eye estimation of its depth of colour and viscosity. Neither of these characters gives us correct information on the concentration of the bile. We, therefore, in this paper, make a plea for an approximately exact quantitative estimation of the concentration of the bile by means of the refractometer.

The use of the bile obtained by the duodenal tube is not very satisfactory as a method to ascertain the exact concentration of the bile. No exact division of the bile into fractions from the common bile duct, gall-bladder and liver can be made by this procedure, notwithstanding various claims to the contrary. By far the most valuable of the clinical methods for getting correct information on the concentration of gall-bladder bile is the submission of the bile removed at operation to suitable physical examination. With clear bile it is perfectly easy to use the refractometer and to get a direct reading, even although the bile in the dog or rabbit may be deeply coloured and contain up to 20% or even more of bile salt fraction. If the bile is cloudy, its concentration may be ascertained by diluting it and taking the refractive index of the dilution. By calculation from such index, the index of the original bile may be derived correctly enough for clinical purposes. We have found in slightly cloudy bile that by use of the neon light and red filter a sharper refractometric reading may be obtained. If, on the other hand, the bile is very cloudy, a direct reading with the neon light may be possible, but we recommend the taking of the refractive index of the bile salt fraction solution, which we prepare as follows:

1. To one cubic centimetre of bile in a test-tube add about nine cubic centimetres of pure ethyl alcohol. Boil the mixture to coagulate the protein present.

2. Remove the coagulated proteins by filtration through paper and evaporate off the alcohol and water from the filtrate by heating over a water bath at 100° C. The residue thus obtained consists of the bile salts and inorganic salts of the bile taken. By redissolving this residue in water and making the volume up to one cubic centimetre, the original volume of bile taken, the refractive index of this solution gives us a good idea of the bile salt content of the original bile, for the inorganic salts of the

bile are small in amount and do not vary greatly. This solution we term the salt-bile-salt fraction of bile.

3. The dry residue from 2. may be extracted with absolute alcohol and the inorganic salts (scarcely soluble in absolute alcohol) separated off by filtration. The filtrate is then heated over the water bath at 100° C. to evaporate off the alcohol, and finally the dry residue is redissolved in water to one cubic centimetre volume and the refractive index of the solution is determined. This we call the bile-salt fraction solution.

Note. At no stage is the residue after being heated at 100° C. completely dry. Therefore traces of inorganic salt may be still present in the bile salt fraction solution. On the other hand traces of moisture facilitate redissolving of the bile salts, and moreover taurocholic salts, being hydroscopic, are very difficult to dry completely.

These processes are too tedious, however, for use in the operating theatre; moreover, in dealing with white bile they are not necessary. It will be found that with so-called white bile the refractive index of the bile salt fraction solution will not be much higher than that of water; it contains little or no bile salt. The concentration of the bile of the gall-bladder was originally deduced from the facts that gall-bladder bile might have about, say, 14% of total solids, whereas the bile obtained from biliary fistulæ was found to have about 2% of total solids.[2] When these solids were examined in the two varieties of bile, it was not found that their constituents existed in the same proportions in the two types. For example, apparently the water and inorganic salts were absorbed by the gall-bladder wall at equal rates. The cholesterol was not found in gall-bladder bile to be anything like so highly concentrated as the bile pigments or bile salts, even although suggestions have been made that cholesterol might actually be added to the bile from the gall-bladder wall. Mucin is added to the bile during its stay in the gall-bladder.

We owe to Mann and Bollman[3] a very striking demonstration of the effect of the gall-bladder in concentrating bile. They showed that if the common bile duct is ligated in a suitable animal and the gall-bladder is left uninjured, jaundice does not develop for thirty-six to forty-eight hours; while if, in a control animal, the gall-bladder is removed at the same time that ligature of the common bile duct is carried out, jaundice appears in three to six hours. This difference was most reasonably explained by the assumption that the intact gall-bladder concentrated the bile pigment it received from the liver and that during this process the onset of jaundice did not occur, but when the gall-bladder, after thirty-six to forty-eight hours, had reached the limit of its concentrating power, then jaundice did occur. When no concentration occurred, because the gall-bladder was removed, then jaundice occurred after three to six hours.

Friedrich,[4] a German surgeon, in dealing with anomalous cases of gall-bladder disease, stated that often no evidence of disease of the gall-bladder was found at operation. In such cases he recommended that bile should be aspirated from the gall-bladder and examined as to its appearance and concentration. He held that diseased gall-bladders might have lost to a varying degree the power of concentrating the liver bile and that in some cases the evidence of this loss of power was the only evidence of disease that could be found. He removed the otherwise apparently normal gall-bladders of six such patients, with the result that after two and a half years they were still entirely well. Unfortunately his work has been available to us only in abstract form, consequently we have no information as to his method of measuring the concentration, nor yet of his standard of the normal. Refractometry provides a quick, accurate and quantitative method of estimating the density of the bile, and might very well be available in the operating theatre. If the bile is at all clear, the estimation can be made in about two minutes quite correctly enough for clinical purposes and it should provide a ready check on Friedrich's thesis.

Technique.

A drop of bile is placed on the prism of a Zeiss dipping refractometer and a reading is taken at 17·5° C. If the margin between the dark and light fields of the refractometer is not sharply defined, it is advisable to dilute the bile with water and to take a reading of the dilution. With certain solutions this would not be a legitimate proceeding, but with bile, as far as we have ascertained, it seems to be so. We have examined bile from the human subject in various conditions and from many different species of healthy animals and this bile has varied in refractive index from 1·3355 to 1·3769. All the variations observed have been within 414 units in the fourth place of decimals; on which account, therefore, we will not give the full reading of the index in this paper, but only the three significant figures in the second, third and fourth places of decimals. For example, bile having an index of 1·3431 will be recorded as having an index of 431.

A sample of ox bile was taken, which was clear and which gave a direct reading of 524. It was diluted to 1/10 with distilled water, the dilution being carried out by adding 0·2 cubic centimetre of bile in a McLean blood sugar pipette to 1·8 cubic centimetres of distilled water in a small squat test-tube, the pipette being washed out with the water used for the dilution. This was done four times and on each occasion the refractive index of the dilution was found to be 351. The refractive index of water is 332, so that the difference between the index of water and that of the bile dilution equalled 19 units in the fourth place of decimals. These 19 units represented the refractive effect of the dissolved matter in a one in ten dilution of the bile. Ten times this effect would be equal to 190 units in the fourth place of decimals, and if this was added to the refractive index of water, 332, an index for the bile would be obtained of 522. It was in actual fact 524 by the direct reading. The same experiment was carried out on a second sample of ox bile; its direct reading was 535 and the calculated index obtained from the one in ten dilution was 527. These small differences would not be significant in clinical work. Many similar experiments were carried out and gave similar results.

Refractive Indices of the Bile of Various Animals.

Owing to the difficulty in getting normal human bile, a comparison of the refractive indices of the gall-bladder bile of different species was undertaken, the results of which are summarized in Table I. In one column the average refractive index from the samples of bile from each member of the different species is recorded, while the adjacent column gives the limits of variation of the indices of the specimens of bile that were examined from the different members of the same species. An interesting fact revealed by the table is that the bile of the guinea-pig has the lowest density of all the kinds of bile examined. Its index is only about 40 units in the fourth place higher than that of water. Apparently the gall-bladder of the guinea-pig is essentially a storehouse for bile and only to a negligible extent a concentrating organ. Further work on this subject is embodied in Table II.

In the series of species dealt with in Table I, the average index rises in an irregular manner, but the interval between the average index of the guinea-

Table I.
Standard Refractive Indices of the Bile of Various Animals.

Bile.	Number Averaged.	Average Refractive Index.	Average Refractive Index less Index of Water.	Extremes of Variation in Refractive Indices.	Extremes of Variation in Refractive Indices less Index of Water.
		n D 1·3.	Units in Fourth Place of Decimals.	n D 1·3.	Units in Fourth Place of Decimals.
Water		332	—	—	—
Guinea-pig		373	41	355–387	23–55
Frog	4	502	170	431–589	99–257
Fowl	3	536	204	513–575	181–243
Sheep	6	533	201	509–582	224–239
Ox	6	546	214	468–664	136–332
Pig	7	558	226	427–628	95–296
Human	3	567	235	487–611	155–279
Opossum (Australian)	4	571	239	479–657	147–325
Monkey	2	592	260	564–621	232–289
Cat	6	679	347	635–741	303–409
Dog	12	687	355	534–769	202–437
Rabbit	12	699	367	596–772	264–440

pig's bile and that of the species having the next higher index is separated by a wide gap, no less than 129 units in the fourth place. The average indices of the bile of the fowl, sheep, pig, normal man, the common Australian opossum, and the monkey are not very different from one another and all vary between 536 and 592 units. The indices of the rabbit, cat and dog biles are, on the average, extremely high. The determining factor as to why a species has a gall-bladder bile of high or low concentration is difficult to ascertain. It does not appear to be associated with the type of diet, for the guinea-pigs and the rabbits in this laboratory get practically the same diet; nevertheless the indices of their bile are at the opposite ends of the scale. The guinea-pigs, however, are bedded on oaten hay and eat a little of it. The rabbits are bedded on sawdust. It has been suggested that the differences in concentration might be due to the continuous or discontinuous feeding habits of the species, but this again seems unlikely. The explanation may possibly be an evolutionary one. When the animal first develops a gall-bladder, it is reasonable to suppose it would be simply a storehouse for bile, the power of concentration being developed in course of time. If this is the true explanation, the guinea-pig's gall-bladder would be of comparatively recent origin, while the gall-bladder of those having highly concentrated bile would be derived from more remote ancestors. The gall-bladder of the guinea-pig is relatively large for the size of the animal, this largeness of size being correlated with the low concentration of the contained bile. The refractive index of normal human bile is probably about 200 units more than that of the guinea-pig's bile and 120 units lower than the index of the dog's.

Refractive Index of Normal Human Bile.

It is extremely difficult to ascertain the concentration of normal human bile. It is only very exceptionally possible to obtain a sample of bile from the human subject unless the patient is suffering from gall-bladder disease or manifests symptoms which may be reasonably attributed to such disease. Our normal human bile has been taken at operation from gall-bladders which showed no apparent defect. According to Friedrich, such gall-bladders might, however, appear quite normal and nevertheless have a defective concentrating power. It is difficult for us to believe that the human bile from which we took our indices came into Friedrich's group, for the indices were high in these cases, very definitely higher than the indices of the bile from diseased gall-bladders, which we shall consider in a later section of the paper.

In deciding the refractive index of normal human bile, we selected from sixty samples of bile, chiefly from the operating theatre of the Alfred Hospital, those that showed no stones or evidence of internal

Table II.
Refractive Index of Guinea-pig Bile.
(Further series killed to reduce surplus stock.)

Group Number.	Approximate Weight in Grammes.	Experiment.	Average Amount of Bile in Cubic Centimetres.	n D 1·3.	Index of the Bile *minus* the Index of Water.[1]
I	500	25 guinea-pigs 13/1/33. Fasted for one day.	1·3	374	42
II	500	48 guinea-pigs 25/1/33. Fasted for one day.	1·25	383	51
III	400	50 guinea-pigs 2/3/33. Fasted for one day. (Hot weather.)	1·0	390	58
IV	300	100 guinea-pigs 8/3/33. Fasted for one day. (Hot, dry weather.) (Prime stock bucks.)	0·8	410	78
V	300	49 guinea-pigs 16/3/33. Fasted for one day. (Half bucks and half does.) Given water for one week previously.	1·4	372	40
VI	300	100 guinea-pigs 1/5/33. Fasted for one day, but no water given previously.	0·6	406	74

[1] The numbers indicate in units of the fourth place of decimals the refractive effect of the dissolved substances in the bile.

Remarks.—Group IV seemed to give a high refractive index for the pooled bile, which was thought to be due to dry, hot weather and lack of water. Group V, to which water was given for one week previously before finally fasting for one day, shows a marked drop to the normal value. In Group VI no precaution as to water requirements was taken, with the result that again the reading of the refractive index is relatively high. The marked uniformity of concentration throughout, however, is very striking, indicating that no substantial concentration of the bile occurs in the guinea-pig's gall-bladder.

obstruction and no evidence of infection nor any evidence of external obstruction. In our first forty cases we had three such, namely XVII, XXI and XXVIII, and the average concentration of those, as judged by the refractive index, was 567. This number was, therefore, provisionally taken as normal. In the case of XVII, however, the pancreas was described in the notes of the operation as hard and enlarged, and one felt doubtful about the inclusion of this case. It seemed possible that an external obstruction might be developing. The other two normals, having biliary indices of 604 and 611 respectively, were definitely denser. At a later stage of the research another case (No. LII) turned up which appeared normal and which had an index of 570, so that the average of 567 which we had calculated from the first three seems to be reasonable.

The Determination of Bile Salt in Bile by the Gregory Reaction.

In 1929 Gregory and Pascoe[5] described a new colour reaction which is produced when bile salt is heated with sulphuric acid and furfural in suitable proportions. A pure blue colour is produced which is stable for two or three hours, so that ample time is available for comparison of colours produced by an unknown with that of a known standard of pure bile salt. The colour is reproducible quantitatively and specifically by bile salts. Substances such as glycine, taurine, cholesterol *et cetera*, which give a positive Pettenkofer reaction,[6] give no reaction with the Gregory test. Gregory and Pascoe found that bile pigment did not interfere with the colour reaction except when the results were being read in the colorimeter. They overcome this difficulty by illuminating the colorimeter with monochromatic light of wave length (6,200 Angström units) corresponding to maximum absorption for the blue coloured compound of the reaction. This was accomplished by using a neon light and red filter. They did not find any colouring matter in bile which would absorb the red light and interfere with the colorimetric readings of the blue compound. Gregory and Pascoe found that it was futile to try to remove the bile pigment from bile, as this was attended by great loss of bile salt, and moreover was not successful in completely separating the pigment from the bile salt. The Gregory method seemed to offer a reliable and simple method of estimating bile salts in bile. To remove protein from gall-bladder bile, they boiled the bile with alcohol and took up the residue from the alcohol extract in water.

The Technique of the Gregory Test.

The technique of the Gregory test is as follows:

Place in a test-tube one cubic centimetre of bile diluted in water of about the final concentration of the standard. A series of several strengths may be necessary to strike the one required.

Place in another tube one cubic centimetre of standard purified bile salt solution in water containing 0·1 to 0·2 milligramme of bile salt.

To each tube then add six cubic centimetres of a 45% solution of sulphuric acid and one cubic centimetre of 0·3% furfural solution.

The tubes are then loosely stoppered and placed in a water bath at 65° C. for thirty minutes, when the standard will show a pure blue colour. The other tubes will show more or less colour in proportion to the amount of bile salt present. Gregory and Pascoe remark that "it is noteworthy that when the concentration was less than that of the standard the error was positive in sign, while a greater concentration than the standard gave a negative error". It is therefore necessary, as we also found, to have the concentration of the unknown reasonably close to that of the standard for reliable colorimetric results. Gregory and Pascoe, for their standard, purified glycocholic acid by recrystallization from alcohol by the addition of ether and a little hydrochloric acid. They purified furfural by repeated distillations. In the test they used as standards from 0·1 to 0·2 milligramme of bile acid, sometimes 0·16 milligramme. As our standard we prepared purified sodium choleate (Merck's) by repeated precipitation from alcohol by ether. The final yellowish white brittle mass was apparently largely sodium glycocholate as it was not hydroscopic. We used 0·16 milligramme as standard.

Estimation of Bile Salt in Ox Bile by Gregory Method.

Ox bile, which usually contains about 10% bile salt, was diluted with water so that one cubic centimetre would be equal to one cubic centimetre of the 0·16 milligramme standard glycocholate. A range of dilutions to cover the possible concentrations of 5%, 6%, 7%, 8%, 9% and 10% were made. They resulted as shown in Table III.

Table III.

Dilution.	Colorimetric Reading in Millimetres.	Standard. Millimetres.	Colorimetric Bile Salt.
Taken as 5%	15	25	8·3%
Taken as 6%	16–17	25	9·1%
Taken as 7%	18–20	25	9·2%
Taken as 8%	20–22	25	9·5%
Taken as 9%	24–25	25	9·2%
Taken as 10%	27–28	25	9·1%

It is seen from the above that the correct dilution was the one on the 9% basis, but if we rule out the 5% basis dilution the others are in practically good agreement. Our chief technical difficulty with this test was experienced in getting uniform colorimetric readings due to inconstant sensitivity of the eye. Readings were done in duplicate and both readings recorded as above. With our illuminator 25 millimetres for the standard was satisfactory.

Later, Reinhold and Wilson[7] introduced a modified Gregory test, using optimal conditions whereby they claimed to have obtained more than double the sensitivity of the Gregory and Pascoe method. As a standard they recommend 0·215 milligramme of sodium cholate in water (0·5 millimolar solution). They found that by "comparison of pure conjugated and unconjugated cholic acid, equimolar quantities produced equal amounts of colour. The reaction appears to be specific for the cholic acid series".

We adopted the modified Gregory test and consequently got deeper blue reactions.

Modified Gregory Reaction on Guinea-pig Bile.

A test on pooled bile from twelve guinea-pigs was done by the Reinhold and Wilson modification of the Gregory test.

The standard gave the usual strong blue reaction, but the guinea-pig bile gave no colour reaction. Another test done on the bile of a freshly killed guinea-pig, one tube containing 0·1 cubic centimetre of bile and another 0·01 cubic centimetre of guinea-pig bile, gave no blue colour. Assuming that only 1% of bile salt was present in the guinea-pig bile, this would mean that 10 milligrammes failed to give a reaction. Further tests done with larger quantities of alcohol-soluble fraction of guinea-pig bile also failed to give the blue colour. At most a pale green colour was produced. Guinea-pig bile gave, however, a positive Pettenkofer reaction.

Modified Gregory Reaction on Rabbit Bile.

The bile of tame rabbits was first treated with alcohol to remove protein, and then tested by the modified Gregory test.

Usually we expect a high concentration of bile salt in rabbit bile, judging by the refractometric reading of the alcohol-soluble fraction anything from 15% to 20%. However, in the Gregory tests the blue reaction was produced equal to the standard only by amounts indicating that there was less than 5% bile salt present by this test.

These results seem to indicate that bile from the guinea-pig and rabbit and possibly from other animals may contain bile salts which do not react with the Gregory reagents. We, therefore, abandoned the method for routine purposes in our comparative work.

The Conversion of Refractive Indices into Percentage Strengths of Bile Salt.

The percentage quantity of any one bile salt contained in any concentration of it may be obtained by taking the refractive index of the solution *minus* the index of water and dividing by a factor. When bile does not contain a large amount of protein or blood or serum, that is to say when it is not white bile from obstruction or bile containing blood or serum from cholecystitis, but if it is normal in colour and appearance, the calculated percentage strength will not be far out if an average factor is used, and we suggest for use as that average factor, 20.

Take for example Number XVII with a refractive index of 1·3487. Taking the last three figures of the index as the significant figure and subtracting from it 332, the index of water, we get 155. Dividing this by 20, which is our average factor, we get 7·75, whereas we actually found 7·6%.

This means that the protein present in normal bile or in bile having a normal appearance is fairly constant, but in white bile there may be 2% or 3% or more protein, and in the bile that comes from cases of acute cholecystitis there may be an equal quantity.

The Effect of Fasting on the Concentration of the Bile.

In the preparation of patients for cholecystography, it is the practice at the hospital to administer the dye *per os* on the evening before the X ray films are to be taken. The patient is instructed to eat no breakfast and to keep away from the smell of food and avoid the thought of it. He may, if he chooses, take small quantities of water. X ray examinations are then made at 9 a.m. and 12 noon the next day; at 1 p.m. after the second film has been taken the patient is given a meal rich in fats, then a third and final film is taken at 3 p.m. No purgatives are administered during the period under review. From these films the conclusions as to the concentrating power of the gall-bladder may be drawn. An attempt was made to ascertain the effect of fasting on the refractive index of guinea-pig's bile. Table I shows the refractive index of normal guinea-pig's bile to be approximately 373.

Six guinea-pigs were taken and kept without food and water for twenty-four hours. They were then killed and the refractive indices of their biles were ascertained. The indices were respectively 374, 375, 401, 389, 374, 397, giving an average of 385. Fasting for twenty-four hours from food and water, therefore, raises the index very slightly. Six guinea-pigs were kept without food and water for a period of forty-eight hours, after which the average refractive index of their bile was found to be 406.

This shows an increase in the concentration of the bile, but it must be looked upon as simply a manifestation of the relative desiccation of the body, for it was soon found that if water was supplied to guinea-pigs they could be kept without food for forty-eight hours without this second increase in concentration occurring.

Another series of guinea-pigs was kept without food for twenty-four hours, but during the time had access to water; these conditions approximate somewhat to those used in the hospital patients who are about to have cholecystographic examinations made. The period of fasting, however, of the patients would be from four to eight hours shorter than those of these guinea-pigs. The average index of the bile of these animals was 389.

Yet a fourth series of six guinea-pigs was kept without food for forty-eight hours, but had access to water during the time. The average index of their bile was 383, a value definitely lower than that obtained from the biles of guinea-pigs that had been deprived of both food and water during forty-eight hours, but corresponding fairly closely with that of the pigs that had been deprived of food and water for twenty-four hours.

The position appears to be that the non-fasting normal guinea-pig, having access to water, has an index of 372 approximately. If it fasts for twenty-four or forty-eight hours but is not deprived of water, the value rises slightly to 386 approximately. If it fasts and is deprived of water for forty-eight hours, the value rises to over 400 units. This latter figure, though, is to be taken rather as an index of the desiccation of the body than an evidence of specific concentration of the bile. During the summer we were surprised to find that the refractive index of the average guinea-pig's bile was higher than the above figures. Actually it was 410 units (see Table II), but this was found to depend upon the fact that the only considerable source of water the guinea-pigs had was the green cabbage leaves in their ordinary diet. No actual water, as such, had been provided for them. As soon as water was provided it was found that the average refractive index of the bile of 49 guinea-pigs was again 372 (see Table II). Fasting from food alone makes only a small change in the concentration of the guinea-pig's bile. Deprivation of water occasions a much greater change in its optical density. The pigs in the hot weather get on perfectly well on a diet of cabbage leaves, bran and maize meal, without water. Experiments carried out in the rabbit are recorded in Table III.

The bile of the rabbits fed normally in Experiment I had on the average a somewhat lower refractive index than that of the fasting animals. One of these normally fed animals, however, an old emaciated rabbit, was found to have bile giving a very low refractive index. If the index of this bile is excluded in calculating the average value of the bile of the normally fed animals, then there is a very small percentage of difference between the average indices of the various groups.

The experiment illustrates well the small volume of the bile compared with that of the guinea-pig (shown in Table II) having regard for the weights of the respective animals.

TABLE IV.

Refractive Index of the Bile of the Tame Rabbit.

Experiment 1. 5/12/32. Effect of Feeding.

Group.	Number	Amount of Bile in Cubic Centimetres.	Average Amount of Bile in Cubic Centimetres.	n D 1·3	Average Index of Group	Average Index of the Group *minus* the Index of Water.
A. Fed normally	1 (Old emaciated Rabbit.)	0·5	0·5	596	1·3674 (Excluding Rabbit 1, Average n D = 1·3700)	342 (If first rabbit is excluded, 368.)
	2	0·6		715		
	3	0·25		664		
	4	0·6		721		
B. Fasting from food and water for one day	5	0·8	0·8	692	1·3719	387
	6	0·6		763		
	7	0·9		683		
	8	1·0		737		
C. As *B*, but water available. (Not taken apparently)	9	0·4	0·55	772	1·3704	372
	10	0·5		686		
	11	0·5		692		
	12	0·8		665		
Average			0·6		1·3699	

Experiment II was carried out on March 27, 1933. Parts A and C of the experiment recorded in Table IV were repeated later, as follows:

Group A.—Fed normally. Six rabbits gave an average volume of 0·8 cubic centimetre of bile, the average index being 1·3682. The average index *minus* index of water was 350.

Group B.—Fed normally, *plus* water available for four days. (Water not seen to be taken.) Six rabbits gave an average volume of 0·8 cubic centimetre of bile, the average index being 1·3698. Average index *minus* index of water was 366.

The average volume of bile for the two groups was 0·8 cubic centimetre, the average index being 1·3690.

Again there is practically no difference between the indices of the bile of rabbits given water with their food and those of the bile of the rabbits not given water, explained simply by the fact that the rabbit does not avail itself of the water supplied; the rabbit is a dry feeder.

Experiment III was carried out on April 3, 1933. It shows the effect of continuous bran feeding. It was thought that the rabbit, by eating excessive amounts of dry bran, might concentrate its bile above normal.

Six normal half-grown rabbits were given the usual green food and for four days an excess of bran. The animals were then killed. The stomachs were found full of bran and the gall-bladders almost empty. The bile appeared normal. The pooled bile had a refractive index of 1·3593, 261 units in the fourth place of decimals higher than the index of water.

Three control rabbits fed normally on a limited diet and without excess of bran gave a greater amount of bile per animal than the above test animals. The pooled bile gave an index of 1·3686, 354 units in the fourth place of decimals higher than the index of water.

The excessive bran feeding apparently caused the emptying of the gall-bladders of the rabbits thus fed, and contrary to expectation the concentration of the bile found in the gall-bladder was substantially lowered, possibly owing to the emptying process being more frequent than in the case of the normally fed animals. Less time was therefore allowed for concentration.

With these few remarks on the effect of variations in diet on the concentration of the bile in guinea-pigs and rabbits, it is advisable to recount how the patients in this hospital are prepared for operation on the gall-bladder. The practice is unfortunately not uniform, but all the surgeons agree in allowing a meal of a cup of tea and one slice of toast about five to nine hours before operation. When the interval is nine hours, an extra cup of tea or cocoa without solid food may be given six hours before the operation. Two enemata usually precede the operation, one on the evening of the day before it and one on the morning of the same day and about six to nine hours before the operation commences. Some surgeons give two heaped tablespoonfuls of magnesium sulphate in solution two nights before the operation. While the method of preparation, therefore, is not uniform, it does not seem likely that the small differences described would seriously change the concentration of the bile obtained at operation.

Concentration of Human Bile Collected at Operation.

Of 55 specimens of bile examined for concentration of bile salt fraction, 30 showed not more than 2% of this fraction. Of these 30, many were specimens of white bile in which no bile salt could be detected. Thirteen of these 30 specimens were infected. Four of the 13 showed mixed infections. In three of the mixed infections a streptococcal organism was present, the other organism being different in each case—once *Bacillus welchii*, once *Bacillus coli* and once *Staphylococcus aureus*. Of 11 specimens of bile having more than 2% but not more than 5% of bile salt fraction, only three were found infected and in each case only one species of organism was present. They were all intestinal organisms, *Bacillus typhosus* in one case, *Bacillus fæcalis alkaligenes* in another, and *Bacillus friedländer* in a third. These organisms occurred in only slightly concentrated bile. Of seven specimens of bile showing more than 5% and not more than 10% of bile salt fraction, only one was infected, and that with *Bacillus paratyphosus A*. Of seven specimens of bile with more than 10% of bile salt fraction not one was infected. In our material, therefore, the ratio of the infected to the total biles examined varied inversely as the concentration of

the bile salt fraction as follows: 13 : 30, 3 : 11, 1 : 7, 0 : 7. It is well known that intestinal organisms will grow in all these concentrations of bile salt fraction, but the higher concentrations appear to slow the rate of growth sufficiently to permit the mechanical washing out of the gall-bladder and ultimately to effect its sterilization. We are not in a position to give a definite value for bile salt fraction above which we may say the bile is sterile. Our series is too small to enable us to do that, but we can say that the higher the concentration of bile salt present, the less likelihood is there of the bile being infected. Five of the 60 specimens of bile did not have the bile salt fraction estimated. One of them was infected with a coliform organism.

Concentration, Infection and Stones.

Of the 13 infected gall-bladders showing very low concentration of bile salt fraction 11 were associated with gall-stones, and stones were present in 15 of the 17 uninfected gall-bladders with low concentration of bile salt. If infection of the gall-bladder plays an essential part in the production of gall-stones, then it would seem that after stones are produced there is a fair chance of the infection of the bile disappearing when obstruction of the cystic duct has not occurred.

The common organisms found in the low concentration of bile were cocci in nine cases and coliform organisms in five. In one case *Bacillus welchii* was present and that ended fatally; *Bacillus welchii* serum was not used in treatment.

The organisms that were found infecting the bile were as follows:

Case	V.	*Streptococcus viridans.*
Case	VII.	*Streptococcus viridans, Bacillus welchii.*
Case	VIII.	Gram-positive bacillus, Gram-positive diplococcus.
Case	X.	*Streptococcus fæcalis.*
Case	XV.	*Streptococcus fæcalis.*
Case	XVIII.	*Staphylococcus albus.*
Case	XX.	Coliform bacillus.
Case	XXVII.	Small streptococcus, coliform bacillus.
Case	XXIX.	Coliform bacillus.
Case	XXX.	*Staphylococcus aureus.*
Case	XXXIII.	*Bacillus friedländer.*
Case	XXXVII.	Coliform bacillus.
Case	LVIII.	*Staphylococcus aureus*, streptococcus.

Typhoid and Gall-Bladder Disease.

No less than 12 of the 60 samples of bile forming the subject matter of this inquiry came from patients who gave a history of typhoid fever. The *Bacillus typhosus* was recovered from only one of the 12, *Bacillus paratyphosus A* from a second, and *Bacillus friedländer* from a third. *Bacillus coli* was recovered twice and *Streptococcus fæcalis* once—all fæcal organisms. In six of the cases in which a history of typhoid fever was present the bile was sterile.

In Case I, the case showing *Bacillus typhosus*, the patient conducted a dairy and was greatly attached to the work. It was explained to her that unless she submitted to excision of the gall-bladder and so got rid of the carrier state she could not go on with the work. She agreed to the operation, which was performed by Mr. H. C. Trumble. Before operation she had caused two epidemics of typhoid; in the first one due to her the milk was supplied indirectly through a second dairy and on that account probably she was not detected. She was located during the second epidemic and two or three days after the excision of her gall-bladder the excretion of typhoid organisms ceased and she was allowed to engage in dairy work again with safety. In addition to the two epidemics she had caused, two cases of domestic infection had occurred in her own home. The bile from the gall-bladder showed 100,000 typhoid bacilli per cubic centimetre. The paratyphoid *A* carrier, a patient of Mr. Balcombe Quick, was never known to have caused an epidemic.

How many of the 12 patients giving a typhoid history were actually suffering from typhoid fever it would be difficult to say. The interval since the typhoid fever infection occurred was extremely prolonged and extended to a time when the diagnosis of the disease, especially from the paratyphoids, was difficult, or even impossible; for example, one patient 67 years of age had had typhoid fever 42 years previously. Six of the patients were still suffering from infected gall-bladders, but six had no infection whatever about them.

Excision of the gall-bladder is usually curative for the carrier state, though odd persons do continue to carry the infection after it. In the experimental production of the carrier state, Ledingham has used guinea-pigs for the work, but the very low index of the bile of the guinea-pig makes one wonder if the condition is analogous to what occurs in man.

Grouping of Cases According to Findings.

In glancing through our clinical material we find we have various groups of cases illustrated:

1. Absence of bile salt fraction or very small quantity present. This is accompanied by a variable index depending on the protein present from the blood or pus or a constituent of the bile. The index in these cases varies from 358 in Case V to 491 in Case VI, blood being present in the bile from cholecystitis. Such infections frequently depend on blockage of the cystic duct. As a rule no history of jaundice is given.

2. Bile that looks normal and has no abnormal amount of protein, though stones may be present (as in one patient, Case XVII, forty-nine years of age).

3. Bile that looks normal, when no stones, obstruction, changes in the gall-bladder wall or signs of infection are present. Such cases are apparently normal. This occurred in a patient forty-one years of age.

4. Normal bile of low concentration without obstruction, stones or infection. In our cases we have not found any representative of Friedrich's group, but our material is so small that it may well exist though we have not found it.

5. Stones present associated with various degrees of obstruction of the biliary passages, cystic duct or common bile duct. In the case of the common bile duct or hepatic ducts jaundice will be present.

In Case L the bile was received from Mr. C. J. O. Brown. It contained 12·6% of bile salt fraction, and the index was very high, 629. Bile from the hepatic duct forwarded at the same time had 4·8% of bile salt fraction and had an index of 424 only.

It is evident that the bile of the hepatic duct is partly concentrated. It seems possible in this case

that some of the highly concentrated bile of the gall-bladder had been injected into the hepatic duct, perhaps several times, which accounted for the 4·8% of bile salt fraction it contained.

Summary and Conclusions.

1. The average refractive index of the bile of twelve different species varies from 1·3373 for the guinea-pig to 1·3699 for the rabbit.

2. Normal human gall-bladder bile came seventh on the list with an average index of 1·3567.

3. The indices of the other species are given.

4. Friedrich's claim that many samples of bile from entirely normal looking gall-bladders have a low index (and this is the only abnormality that can be found) has not been confirmed by this research.

5. Gregory and Pascoe's reaction for bile salt does not appear to be universally applicable. It does not react with guinea-pig's bile and only in a defective manner with rabbit bile.

6. The effect of fasting on the refractive index of bile from the guinea-pig is to raise it slightly.

7. The withholding of water, especially in hot dry weather, induces a desiccation of the body with a consequent more substantial rise of the index. This does not occur if the animals are allowed to drink water.

8. The rabbit has a very high average index of its bile, namely 699. It has a very small gall-bladder, usually holding about 0·5 to 0·8 cubic centimetre.

9. In man the greater the bile salt fraction, the less the likelihood of finding the bile infected.

10. A large number of infections are found in the weak bile salt fractions frequently attended with blockage of the cystic duct.

11. A typhoid and paratyphoid "A" carrier are described, cured by means of cholecystectomy. In them the concentrations were slight and very moderate respectively.

12. The concentrations of the bile found in the gall-bladder and that in the common hepatic duct in one case were 629 and 424, corresponding to 12·6% and 4·8% of bile salt fraction respectively.

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MEDICAL ORGANIZATION WITH MECHANIZED FORMATIONS.[1]

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THE character of the army is being radically changed by the rapid development of mechanization, and this process is involving all arms — cavalry, infantry, artillery, and the technical services, such as the engineers, the signallers, the army service corps and the army medical corps. Up to the present no essential change has been made in the organization of the medical services in the field, and it is the purpose of this paper to put forward a suggested organization for a field medical unit which would serve the mechanized troops, and to provoke discussion on this most important subject.

It has usually happened in the past that any particular war starts off with the methods and organization which were used at the termination of the previous war; but no war was ever exactly similar to its predecessor, and it is our duty to anticipate, as far as is possible, the nature of a future war and to prepare for it. I think it will not be questioned that the field medical units as at present constituted, efficient and effective though they were in the Great War, are unsuited to serve mechanized units, and that it is desirable that the organization of some of them should be radically changed.

Developments in the army during and since the Great War (no reference will be made to the air force in this paper) have been made, firstly in the production of a tremendously increased fire power by the extended use of machine guns, secondly in the answer to this overwhelming volume of fire, namely, in the use of protection in the form of tanks and armoured cars, and thirdly in increased mobility and rapidity of movement by mechanized transport of troops, equipment and stores. The tactical use of the mechanized forces is by no means standardized, but there is no doubt that with them a commander can make use to a much greater extent of the all-important tactical weapons of surprise and unexpected action.

The establishments of the mechanized forces in this country are not known, but for the purposes of this paper it may be presumed that in accordance with modern practice one or more light horse brigades of a cavalry division might be replaced by an armoured car regiment and two machine gun regiments. In addition, the divisional units, namely, the artillery, engineers, signallers, army service corps *et cetera* will be largely mechanized. The tank battalion we may assume to be either corps or divisional troops to be sent forward for special missions or for particular duties when the occasion demands.

[1] Read at the fifth session of the Australasian Medical Congress (British Medical Association), August, 1937.

It is necessary to organize the field ambulances to fit in with this new type of division, and to do that we must have some general idea of the duties of these troops. They are as follows:

1. Reconnaissance, very often over a long distance. This would be performed by detachments of the armoured car regiment.
2. To cover an advance or withdrawal, to guard a flank, to delay the enemy or to form a mobile reserve.
3. Exploitation and pursuit.
4. Offensive action in direct or indirect cooperation with the main attack.
5. Special missions, such as raids.

The fuel capacity of armoured vehicles is normally sufficient to enable them to travel one hundred miles without refuelling. The radius of action of a mechanized unit may be taken as thirty miles, allowing for forward movement, manœuvring and return to its starting point. It is possible that a squadron of an armoured car regiment may be twenty or more miles away on one flank, and a second squadron as far away on the other flank. It is obvious that one regimental medical officer could not adequately serve the unit in these circumstances. Our task is to organize the medical services to meet the requirements of the mechanized units when employed in any of the above duties.

As regards the divisional units, artillery, engineers, signallers *et cetera*, adaptation of the present medical establishments to the new mechanized form is simple and will not be discussed. Difficulty and probably great difference of opinion arise when the mechanized cavalry division is to be considered, and it is this part of the problem with which this paper is concerned.

There are several courses open; they are the following.

First, regimental medical establishments may be increased. It is obvious that, having regard to the rapidity of movements of the mechanized brigade, to the fact that the squadrons of the regiments may be widely separated, and to the nature of the country over which the troops are operating, the present regimental establishment of one medical officer and one orderly and a small number of stretcher-bearers and men trained in first aid is inadequate for the purpose, though when the brigade is not in action there would be no difficulty in one medical officer carrying out the required duties. In some armies the plan of increasing the medical establishments with the regiments is carried to the extent of providing four medical officers, four ambulance cars and twenty-four other ranks with each regiment. Such a scheme has the objections that it is extravagant; that the men would be idle except during active operations; and that it is inelastic, as it would be difficult or even impossible to detach these medical officers and cars from their own unit, which might not be heavily engaged, and send them to another unit where their services might be urgently required. A more modest addition to the regimental establishment of, say, one medical officer and two cars has the objection that it still may be inadequate under certain conditions, and further, that a regimental medical officer working in his own regimental aid post while fighting was going on could not possibly control the movements of the ambulance cars.

The second method of dealing with the position is to increase the establishment of the existing cavalry field ambulances. When the different character of the light horse regiments and of the mechanized regiments is realized, it is clear that the same organization of the medical services would not do for both arms, and it is doubtful if a commanding officer of a cavalry field ambulance could keep in touch with and control the sections of the unit which had been detached for service with the mechanized troops.

The third method of dealing with the problem, and the one advocated, is to establish an entirely new unit.

Let us consider the requirements of such a unit.

1. It must be capable of collecting and taking to the rear the wounded, under the conditions in which the mechanized troops will be fighting. It has been officially stated that "in fighting periods it is anticipated that no skilled attention can be given to wounded men in ambulance field vans until fighting has ceased, or at least until an ambulance field van has come out of action". The medical officer will thus be unable to attend to casualties as early as has been the case in infantry. He will normally be with "B" echelon. I for one cannot accept this as the rôle of the medical service; such a contention is humiliating to the service and disastrous to the morale of the troops concerned.

2. The unit must be capable of being kept mobile, and also capable of rapid movement. It must be able to keep up with the mechanized forces, and able to go over the same country.

3. It must be organized in such a way that it is adaptable and able to deal with unexpected tasks effectively.

4. It should be able to reinforce the regimental medical establishments when necessary.

The following is the organization which I suggest meets these requirements; and in conformance with the nomenclature of the cavalry division of which it forms part, I would suggest that it be called the motor ambulance squadron. The squadron would consist of a headquarters and three troops. The headquarters staff would consist of the commanding officer (a lieutenant-colonel or major), a major or senior captain as second in command, three captains, quartermaster and possibly dental officer, as well as stretcher-bearers and orderlies and the necessary administrative personnel (to avoid confusion these will not be specified in detail). Six protected ambulance cars would be required, as well as the necessary motor transport for personnel and equipment. Each of the three troops would consist of one captain, two protected ambulance cars, and the necessary personnel and transport.

Several features of the unit may be considered.

The ambulance cars, it is thought, should be of one standard pattern, thus facilitating the supply of spare parts and repairs. They should be six-wheel machines, capable of carrying four recumbent patients, and should be protected by steel plating. Such vehicles are described in *The Journal of the Royal Army Medical Corps*, March, 1936, by Major S. J. L. Lindeman, M.C. The subject is exhaustively dealt with in this excellent article, and I do not propose to go into further detail. It will suffice to say that with this protected ambulance car—named by Major Lindeman a "pramb"—there is no reason why wounded could not be collected and evacuated during actual fighting. In fact it seems to me that such an ambulance car is necessary to accompany armoured cars and tanks in many of the tasks they will be called on to perform. Whether this car should be protected by the Red Cross is open to discussion. Against such protection is the fact that it would probably be ineffective, and also the fact that when an armoured car is put out of action such an ambulance car could be used to rescue the whole crew, wounded and unwounded.

It has been put forward in some quarters that light ambulance cars for two recumbent patients in addition to the heavy ambulance cars described would be a useful addition to the unit, on account of their mobility and speed. I think that the disadvantages of such a car are greater than its advantages, but this question, namely, the most suitable type of car, is one for discussion. It will be seen that in headquarters are three captains and six protected ambulance cars. The object of these on the establishment is to make the unit elastic and adaptable. They would be used to reinforce the ambulance troops, to reinforce the regimental medical establishments, to replace casualties, or to send with detachments of the mechanical units on any special task. It is true that occasions will arise in which it is necessary for the motor ambulance squadron to form a main dressing station and advanced dressing stations, and the organization must be such as would allow this to be done. It must be constantly borne in mind, however, that the unit must retain its mobility, and it must not only keep in touch with the fighting forces, but it must keep up with them. For this reason it would be wrong if the unit were to be rendered immobile even for a few hours by the establishment of these dressing stations, and to avoid this it is considered that the advanced dressing stations formed by the ambulance troops should be no more than collecting or wagon-loading posts, that the headquarters should be mainly administrative in its functions, and that when possible the main dressing station of the nearest cavalry field ambulance should be used.

It is considered essential that the officers for such a unit should be resourceful, possessed of initiative and capable of quick decisions. The apparent surplus of officers on headquarters is necessary in order that casualties may be replaced quickly, and so that an officer may be detailed at short notice to go with an ambulance wagon wherever it may be required. It is desirable that all the vehicles of the motor ambulance squadron should be equipped with two-way wireless communication. This is an ideal which it is hardly likely could be attained, as it would involve expensive equipment and technical training of personnel. It is more than probable that the squadron would be obliged to rely on the signal system of the unit to which it was attached. The possession of one or two motor cycle dispatch riders per troop would be a more practicable means of communication. The troops would be self-contained and capable of being detached and sent anywhere for duty with a mechanized unit which might be detailed for a special purpose.

THE PITUITARY GLAND AND CARBOHYDRATE METABOLISM. II: THE INFLUENCE OF PROLACTIN ON CARBOHYDRATE METABOLISM.

By Charlotte M. Anderson, M.Sc.

(From the Baker Medical Research Institute, Alfred Hospital, Melbourne.)

In a previous paper[1] the effects produced on carbohydrate metabolism by the subcutaneous administration of saline extracts of the anterior pituitary gland were described. It was shown that such extracts possessed a contra-insulin activity and, further, that young rabbits to which extract had been administered failed to show a deposition of liver glycogen after the administration of either insulin or sodium lactate. This latter indicated that the extract had exerted an influence on the fundamental processes of carbohydrate metabolism.

At the time it was impossible to ascribe the above actions to any particular fraction of the extract, although it could at least be said that the effects were specific to the anterior pituitary gland. Attempts had been made to use prolactin prepared according to the method of Riddle, Bates and Dykshorn,[2] but I was unable to obtain a preparation that gave consistent results in respect of contra-insulin activity.

Recently, in a personal communication, H. P. Marks, from the National Institute for Medical Research, supplied me with details of the method which he and Young have been using for the preparation of prolactin. According to Young[3] and Marks,[4] prolactin is the principle concerned in the production of the contra-insulin effects observed after the injection of anterior pituitary extracts.

It is considered that, apart from its lactogenic activity, prolactin is capable of inhibiting the hypoglycæmic action of insulin. This would act as a safeguard during the period of lactation, when sugar is being constantly withdrawn from the body,

with the consequent risk of hypoglycæmia. The contra-insulin action of prolactin might also explain the occurrence of glycosuria in the later months of pregnancy, when the breast tissue, under the influence of prolactin, is being rapidly prepared for lactation.

In a recent publication, Young[5] found that adult rabbits receiving injections of the anterior pituitary "anti-insulin" or glycotropic substance, showed increased values for liver glycogen. Unfortunately the experiments were conducted in only a small number of animals. Six laboratory rabbits and six controls were used. In view of the fact that adult animals are known to show wide variations in liver glycogen values, Young's results are open to criticism. In my own experiments a large number of young rabbits was used, and invariably the liver glycogen percentages of animals treated with saline extracts were slightly but consistently lower than those of the control group.

The main object of the present investigation was to determine whether the phenomena found after the injection of crude saline extracts of the anterior pituitary could be identified with its prolactin fraction.

Methods.

Preparation of Prolactin Fraction.

Anterior pituitary glands from oxen,[1] collected and frozen as quickly as possible, were used.

The glands were weighed and ground in a mortar with a little sand. Chilled saline solution, three cubic centimetres per gramme of fresh tissue, was added. In addition, N/5 sodium hydroxide was added in successive small amounts, so as to bring the pH to 8·5. The mixture was left overnight in the cool room; it was then centrifuged and the supernatant fluid adjusted to pH 5·0 with N/5 hydrochloric acid. After centrifugation the deposit was dissolved in chilled saline solution which had been adjusted to pH 8·0 to 8·5; the pH was then brought to 5·0 and the fluid was centrifuged. This process was repeated until there had been four precipitations in all. The final solution for injection purposes was adjusted to pH 8·0.

Various solutions prepared according to the above-described procedure were tested on adult rabbits to determine contra-insulin activity. In marked contrast to my earlier experiences with prolactin, I was now able to obtain constant results.

A serious complication is the question of bacterial contamination. In some earlier experiments it was found that the products of bacterial growth could cause a considerable inhibition of insulin action. Accordingly, each batch of extract was passed through Seitz-Werke bacterial filters and stored in five cubic centimetre quantities in sterile ampoules that were kept in the cold room. Periodic tests for sterility of the contents were carried out.

Results.

The contra-insulin activity of a batch of prolactin prepared as above was tested on an adult rabbit. The blood sugar response was determined before and after the administration of prolactin. Five days intervened between the two tests. Prolactin was administered in three doses each of six cubic centimetres, given thirty-six, twenty-four and twelve hours before the test. In both experiments food was withheld for twenty-four hours before the injection of insulin. The results of this experiment are shown in Table I.

Table I.

Blood Sugar Response to One Unit of Insulin of Rabbit Number 15.
Weight = 1·8 kilograms.

Before Treatment with Prolactin.		After Treatment with Prolactin.	
Time in Minutes After Receiving One Unit of Insulin.	Blood Sugar Percentage.	Time in Minutes After Receiving One Unit of Insulin.	Blood Sugar Percentage.
0	0·124	0	0·134
30	0·061	30	0·086
60	0·056	60	0·108
90	0·056	90	0·111
120	0·059	120	0·138
150	0·075	150	0·143

These results clearly demonstrate the contra-insulin potency of the prolactin fraction; they were fully confirmed in many similar experiments. In the experiments dealing with glycogen formation, continuous checks were made on the contra-insulin activity of the extract in use. In most instances adult Australian rabbits were used for these latter tests, but for the investigations on liver glycogen young English hutch rabbits from six to ten weeks old were used. It was found that in respect of testing for contra-insulin activity adult Australian rabbits gave results just as consistent as those obtained with adult English hutch rabbits.

Prolactin and Glucose Tolerance.

It has been suggested that the administration of anterior pituitary gland extracts inhibits the peripheral actions of insulin, namely, glucose oxidation and deposition of muscle glycogen. This could account for the contra-insulin effect of the extract and could be detected by the presence of a diminished glucose tolerance as determined by the blood sugar curve after the oral administration of glucose. It is unfortunate that in respect of the effect of anterior pituitary extract on glucose tolerance, many conflicting results have been reported. In my previous paper I indicated that unless the quantity of glucose administered for the purpose of determining glucose tolerance was carefully regulated, erroneous results would be obtained. The ingestion of too much glucose produces an exaggerated hyperglycæmic response, and it is impossible to detect slight but significant differences under different conditions.

In Table II the glucose tolerance as determined by the oral administration of two grammes of glucose is shown in an adult rabbit before and after the administration of prolactin. It will be seen that the pituitary extract has in no way decreased glucose tolerance. This result was confirmed in several similar experiments.

[1] Supplies were made available through the courtesy of Dr. Morgan, Director of the Commonwealth Serum Laboratories.

Table II.
Glucose Tolerance Before and After Prolactin.

Before Treatment with Prolactin.		After Treatment with Prolactin.	
Time in Minutes.	Blood Sugar Percentage.	Time in Minutes.	Blood Sugar Percentage.
0	0·104	0	0·106
Glucose →		Glucose →	
30	0·166	30	0·150
60	0·166	60	0·163
90	0·154	90	0·154
120	0·129	120	0·136
150	0·117	150	0·120

The Effect of Prolactin on Liver Glycogen Formation.

In my previous investigations it was shown that crude saline extracts, although capable of inhibiting the hypoglycæmic action of insulin in adult rabbits, seemed ineffectual in young rabbits. It therefore seemed desirable to investigate this phenomenon with prolactin. The results of such an experiment are shown in Table III, and it is seen that the prolactin fraction has no significant effect in inhibiting insulin action. This result was invariably found in young rabbits from six to ten weeks old.

Table III.
The Effect of Prolactin on Insulin Hypoglycæmia in a Young Rabbit Fasting for Twenty-Four Hours.

Before Treatment with Prolactin.		After Treatment with Prolactin.	
Time in Minutes After Receiving 0·5 Unit of Insulin.	Blood Sugar Percentage.	Time in Minutes After Receiving 0·5 Unit of Insulin.	Blood Sugar Percentage.
0	0·081	0	0·104
30	0·065	30	0·079
60	0·048	60	0·068
90	0·047	90	0·072
120	0·065	120	0·077
150	0·065	150	0·081

In the next series of experiments the influence of prolactin on glycogen formation by insulin or lactate was studied. The details of these experiments are shown in Tables IV and V.

The results obtained from this series of experiments are very definite. They show clearly that the administration of prolactin definitely inhibits the formation of liver glycogen which normally occurs in young rabbits after the intravenous injection of insulin or lactate. The puzzling feature of the experiments is that, as judged by its contra-insulin effect, the extract appears to be inactive in these young rabbits. Nevertheless, when it was tested on adult animals, its contra-insulin effect was quite definite. Despite its apparent inactivity in inhibiting the hypoglycæmic action of insulin in young rabbits, the fact remains that the extract contains a principle capable of influencing glycogen metabolism.

Discussion.

Removal of the pancreas from an animal such as the dog results in a disturbance in the following biochemical processes: (*a*) glycogen storage, (*b*) glucose oxidation, (*c*) neoglucogenesis, that is, the new formation of carbohydrate from protein and fat. The first two reactions become diminished,

Table IV.
Observations on the Influence of Prolactin on Liver Glycogen Formation.
All animals were young rabbits six to eight weeks old.

Rabbit Number.	Remarks.	Weight in Grammes.	Liver Glycogen Percentage.
1	Normal controls, fasting for twenty-four hours.	540	1·1
2		360	0·7
3		880	0·37
4		600	0·84
5		780	0·36
	Average	.. ..	0·67
6	Normal rabbits, fasting for twenty-four hours. 0·5 unit of insulin injected intravenously. Killed two and a half hours later or, if hypoglycæmic convulsions occurred, within this period.	550	1·75
7		460	2·30
8		950	1·50
9		630	1·80
10		1,180	2·10
	Average	.. ..	1·9
11	Treated with prolactin, three injections each of five cubic centimetres, at twelve-hourly intervals before experiment. Fasting for twenty-four hours. Given 0·5 unit of insulin. Killed at end of two and a half hours, or before, if hypoglycæmic convulsions occurred.	560	0·63
12		470	0·4
13		850	0·7
14		570	0·27
15		780	0·28
	Average	.. ..	0·45

whilst the third proceeds at an excessively rapid and wasteful rate. This type of disordered carbohydrate metabolism can be attributed solely to a lack of insulin consequent upon removal of the pancreas. From studies on "diabetic" animals one can conclude that the physiological actions of insulin are the promotion of glycogen storage, glucose oxidation and the regulation of new carbohydrate formation.

From recent investigations it is suggested that, apart from insulin, other hormones might participate in the regulation of the above-mentioned fundamental stages in carbohydrate metabolism. According to Houssay, the anterior pituitary gland secretes a principle that is essential for the main-

Table V.
The Effect of Prolactin on Liver Glycogen Formation from Lactate.

Rabbit Number.	Remarks.	Weight in Grammes.	Liver Glycogen Percentage.	Averages.
1	Normal fasting controls.	490	0·46	0·44
2		870	0·6	
3		500	0·54	
4		560	0·14	
5	Fasting twenty-four hours; received one gramme of dilute sodium lactate intravenously. Killed two hours later.	690	2·5	2·0
6		670	1·8	
7		465	2·16	
8		560	1·6	
9	Treated with prolactin. Fasting twenty-four hours. Received one gramme of dilute sodium lactate intravenously. Killed two hours later.	510	1·2	0·56
10		840	0·9	
11		530	0·08	
12		410	0·08	

tenance of neoglucogenesis. We can therefore, to some extent, guess at the normal interactions of insulin and the anterior pituitary hormone. Working in close harmony, these two hormones control the production and utilization of carbohydrate, the anterior pituitary principle stimulating production from non-carbohydrate sources, insulin regulating the rate of this new carbohydrate formation and promoting its utilization.

In the light of this hypothesis it is easy to explain why hypophysectomy ameliorates the diabetes of the completely depancreatized dog. In such an animal, owing to a lack of insulin, neoglucogenesis would tend to proceed at an excessively rapid rate, with consequent hyperglycæmia and glycosuria; however, if the anterior pituitary hormone is absent, it is impossible for neoglucogenesis to occur, and therefore glycosuria *et cetera* are diminished.

Apart from certain significant differences encountered in diabetes observed in man, and that produced by pancreatectomy in dogs, the recent work of Long[6] makes it quite clear that we can no longer regard human diabetes as a primary pancreatic defect, that is to say, due to a lack of insulin. Rather must we conceive this disease as the result of a loss of balance between certain internal secretions, all of which play some part in controlling carbohydrate metabolism. It is of extreme interest to note that Long has found that the diabetes of depancreatized animals can be ameliorated by removal of the cortical component of the suprarenal glands. In order to explain the close similarity between the effects of hypophysectomy and adrenalectomy on experimental diabetes, Long offers the suggestion that one or all of the hypophyseal hormones exert their effects on metabolism by stimulation of the adrenal cortex.

As previously mentioned, there is some evidence that the anterior pituitary hormones can influence neoglucogenesis and glucose oxidation. In addition, my own results with prolactin indicate an influence on glycogen formation from lactate. It seems certain that excess of prolactin can inhibit the formation of glycogen from lactate, whilst synthesis from glucose remains unimpaired.

The effects produced by injection of anterior pituitary extracts vary considerably in different animals. In dogs, Houssay[7] has been able to produce (i) a resistance to insulin, (ii) an exaggerated response to the hyperglycæmic action of adrenaline, (iii) a diminished glucose tolerance, and (iv) glycosuria and ketonuria. On the whole the condition produced by these extracts is closely similar to that seen in experimental diabetes. In my experiments with prolactin on rabbits I have been able to elicit only a resistance to insulin. Glucose tolerance and response to adrenaline have been unaltered.

Several explanations have been advanced for the action of the contra-insulin hormone.

The fact that the rabbits treated with prolactin in my experiments showed a normal glucose tolerance is not in full accord with the theory that administration of the diabetogenic principle inhibits the peripheral utilization of glucose. In the presence of decreased glucose oxidation and storage as muscle glycogen we would expect the glucose tolerance to be diminished. In addition, I have not been able to show that prolactin sensitizes liver glycogen to glucogenolysis by adrenaline.

Long, in discussing the work of Verzar and his co-workers,[8] calls attention to a phenomenon that might be of great importance in elucidating the exact relationship of the anterior pituitary hormones to carbohydrate metabolism. It was found "that removal of the suprarenal cortex markedly interferes with the phosphorylation processes by which fats and carbohydrates are transferred through the intestinal wall". It would therefore seem worth while to study the influence of prolactin on the prosphorylation of blood glucose which is necessary for its conversion to muscle glycogen. Such changes are of fundamental importance in carbohydrate metabolism, and it is quite possible that some of the more pronounced effects seen after the administration of pituitary extracts may originate from disturbances in phosphorylation processes.

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Reports of Cases.

TWO CASES OF NASAL INFECTION.

By Ernest Culpin,
Brisbane.

The two following cases of nasal infection appear sufficiently interesting to be worthy of recording.

Case I.

Case History.

Mrs. X., aged forty years, consulted me on August 10, 1936, and asked for a polypus to be removed from the

left side of the nose. She was the mother of two children. She gave the following history. Difficulty of nasal respiration had commenced eight or nine months previously. The left side was now completely blocked; she had not had many head colds, although she used to sneeze a lot. She had suffered from frontal headaches for the last few weeks, and her left eye had a tear all the time. Her face had been swelling; she had had a sore throat and influenza a few weeks previously. She still had a nasty cough. She had had measles, chicken pox twice, typhoid fever and double pneumonia, and anæmia had been present for several years after her second confinement.

Physical examination revealed that her teeth had been removed and that her tonsils were enlarged, her palate was anæmic, her naso-pharynx was not visible. The nose was expanded somewhat, tender on the left side in the upper naso-maxillary area; the left nostril was completely occluded by a doubtful polypus, the nasal mucosa was slightly pale, and no frontal sinus tenderness was present. Transillumination revealed that the frontal sinuses were large, the outline of the left being hazy, the antra were fairly clear, and there was a good pupil reflex on the right side, and a faint reflex on the left side. X ray examination was declined, as the patient only wanted the "polypus" removed.

On August 11, 1936, I was unable to get any instrument into the left side of the nose. A specimen was taken from a tumour of the left inferior turbinate bone; sarcoma was suspected. Dr. Taylor's report of the paraffin section was the following:

> The tissue is composed of a mass of inflammatory cells, for the most part lymphocytes, with much vascular congestion present. The blood vessels are mature and no mitotic figures seen. I think the question of sarcoma need not be considered.

On August 17, 1936, X ray examination revealed "grossly thickened mucosa in the left antrum, slightly on the floor of the right".

On August 27, 1936, using intratracheal ether anæsthesia, I noted either a growth or heaped-up epithelium by the dental plate on the left upper alveolus. A specimen was taken. Dehiscence of the anterior antral wall and a polypoid condition of the antral mucosa, mostly on the naso-antral wall, were observed; no pus or fluid content was present. Dehiscence of the posterior wall and roof was apparent; the infraorbital nerve was necrotic and broke away posteriorly. Some degenerated ethmoid was removed; free bleeding occurred. Most of the inferior turbinate was removed. The mucosa on the floor of the nose was thickened.

On September 1, 1936, Dr. Taylor's report was as follows:

> Ethmoid sectioned in two places shows mucosa with an abundance of mucus-secreting glands and an intense subacute inflammatory reaction. The ? infraorbital nerve is nerve tissue *plus* hæmorrhages, but shows no inflammation. No evidence of malignancy seen.

On September 8, 1936, the patient had improved and was going home.

On September 11, 1936, external swelling was still present, and an iron mixture was prescribed. On September 16, 1936, the patient was a little improved. On September 21, 1936, the nose was stuffed up; there was no bleeding, but a thin watery discharge and swelling to the right side of the nose were present. The temperature was 37·58° C. (99·6° F.) and the pulse rate 100. "Acriflavine" irrigations were continued.

On September 28, 1936, with intratracheal ether anæsthesia, left lateral rhinotomy was performed. The superficial tissues were very thick, but softened. I made an opening into the ethmoid region; tissue that looked as if it were malignant was present. The maxillary bone was roughened, but some of the nasal process was cheesy in consistency. There were no anatomical details to make out in the ethmoid region, and masses of tissue were removed. The nasal and antral cavities were made into one. No pus was seen. A bismuth-iodoform-paraffin paste gauze dressing was applied.

On September 30, 1936, Dr. Taylor's report was as follows:

> Intense round-celled inflammation with marked congestion. No evidence of malignancy. Culture from maxilla—streptococci present.

On October 1, 1936, thirty cubic centimetres of polyvalent antistreptococcal serum were injected. The serum was continued, together with autogenous vaccine, until October 12, 1936, after which the vaccine only was used once weekly until November 21, 1936. There was no reaction to the Wassermann test. On October 26 the patient was referred to Dr. Middleton for infra-red and high-frequency treatment. Up to this time there had been no purulent discharge and only slight intermittent elevations of temperature. This treatment appeared to cause a reaction with actual suppuration, which on November 24, 1936, led to the wounds breaking down and to the appearance of an offensive purulent discharge with some sequestra.

On November 29, 1936, the patient was admitted to Brisbane Hospital. "Acriflavine" was the mainstay of the local treatment; "Magnoplasm" plasters were also used. On December 15, 1936, more sloughing had occurred, with an odour suggestive of bone destruction. On December 28, 1936, the patient looked better; her skin was healthier, and although there was a large gaping wound in the naso-maxillary region, it appeared to be granulating. Some sloughing was still present.

On January 1, 1937, the patient had had severe uterine hæmorrhages. Radium was applied by Dr. H. S. McLelland. The patient was wasting and very anæmic. During the first week in February she had a severe hæmatemesis, from which she rallied. On February 12, 1937, the patient seemed to be progressing fairly well, although she was weak and anæmic; the local condition appeared to be slowly improving, but the patient had another severe hæmatemesis, from which she did not recover, death rapidly ensuing.

Discussion.

A little while before the end it was learned that about nine months before consulting me the patient had had a left upper lateral incisor or canine tooth extracted and a root abscess had been present. The bone infection appeared to have commenced in this region and to be more advanced in the lower naso-antral region and inferior turbinate and not to have arisen from sinus disease. The duration of the infection was apparently at least fourteen months before death resulted, the final cause being hæmatemesis. In the early stages I was convinced that the condition was malignant; I even told the husband that I hoped it was so, as I considered that the prognosis would be better. It is worthy of note that it was not until the patient had a course of electrotherapy that obvious pus appeared. The surgical treatment was not beneficial. The possibility of removal of the maxilla was discussed, but with the extent of the infection it was considered to be impracticable. The serum was useless; the doses may have been too small, but it is doubtful whether larger doses would have been of benefit. "Acriflavine" appeared to be the most useful local application. The uterine hæmorrhages were associated with fibroid growths. The apparent gastric hæmorrhages were probably the result of sepsis and anæmia. In a similar case, once the diagnosis is established, I would recommend electrotherapeusis and sulphanilamide with general tonic treatment, unless the condition was seen in the early stages, before it had advanced to such an extent as in this case, in which the whole maxilla and ethmoid were involved when I first saw the patient. The onset had been very insidious.

Case II.

Case History.

Mrs. Y., aged sixty-two years, *multipara*, was on August 31, 1937, seen by Dr. C. E. Wassell on my behalf. She

had had a cold eight weeks previously and became deaf; she had had severe pain in the ears, with discharge, which cleared up after ten days' treatment. Four days previously she had had severe pain in both ears, worse in the left; she had been very deaf all the time. No pyrexia had been present. Years earlier she had had a tick in the left ear. She was subject to sore throats and to "catarrh".

On examination she was seen to have no teeth; the tonsils were enlarged and infected, the tongue was very coated, the breath was very offensive; the septum was very much to the left, and obstructive. Transillumination was good. Both ear drums were red and the landmarks had gone; no mastoid tenderness and no rise of temperature were present. The Rinné test gave no result in each ear. Myringotomy released thick and copious pus under pressure. The condition of the ears gradually cleared up with local treatment, and the hearing improved with inflation. On September 23, 1937, the patient complained of pain in the region of the right temporomandibular joint. Sedatives were given.

On September 25, 1937, her ears had healed, but she was still complaining of pain. Inflation was continued by catheter, and about this time a trace of blood would appear in the right inferior meatus of the nose after the catheter was used, although manipulations were carried out very carefully. Medical diathermy was applied for the pain, and on October 1, 1937, the patient was more comfortable and returned home.

On November 24, 1937, the patient returned to Brisbane, complaining of her nose being sore inside and of the discharge of "rubbish and blood" from the nose; she said the discharge was now becoming more like pus. Also she had had an attack of measles since returning home.

On examination it was seen that her tonsils were large and unhealthy, and the septum was much to the left; bloody crusts were seen in the right side of the nose. No frontal tenderness was present, and both frontal sinuses showed large and clear, and both antra were bright. A nasal ointment was prescribed. Removal of the tonsils and submucous resection of the septum had previously been advised.

On November 25, 1937, the patient was complaining very much of trigeminal neuralgia, which was but little relieved by various sedatives. Injection of the Gasserian ganglion was considered. Excoriations were now seen on the mucosa of the right side of the nose and on the left side of the septum. On December 2, 1937, numerous blood crusts were seen in the right side of the nose, with pus beneath them; also, on the left side of the septum a superficial, ulcerated-looking area was seen, surrounded by an intensely inflamed margin.

Dr. Taylor's report on a swab was as follows.

> Much pus and fibrin, numerous catarrhal organisms and some organisms resembling *Corynebacterium diphtheriæ*. Result of culture tomorrow.

Culture revealed a pure growth of *Staphylococcus aureus*, but no *Corynebacterium diphtheriæ*. However, antidiphtheritic serum was administered, but with no result. The patient complained more of severe pain, insomnia and weakness and of loss of appetite and weight.

After consultation with Dr. Wassell she was admitted to hospital. X ray examination revealed thickened mucosa on the floor of the right antrum, and slightly thickened mucosa on the floor of the left antrum. On December 6, 1937, she was seen by Dr. Alex Murphy, who found nothing wrong with her general system, except some avitaminosis, and prescribed "Abidon" capsules. On February 7, 1937, irrigation of the right antrum revealed no macroscopic evidence of disease. In spite of various local treatments the nasal condition grew worse, the mucosa became more swollen and infiltrated, with much blood crust formation and pus. The pain was worse, being distributed all around the mouth and in the gums; it seemed to radiate from the nasal cavity and also towards the right ear.

On December 16, 1937, the pain appeared easier and the discharge from the nose contained less blood but more pus. Potassium iodide and mercury had no effect.

On December 17, 1937, a deep excavated ulcer began to extend on the right inferior turbinate bone, "apparently from slight trauma caused by the proof puncture". On December 18, 1937, the patient's general condition was worse; she had a very bad night, and the right side of the face was swollen. Five cubic centimetres of "Prontosil" were injected intramuscularly three times a day, two tablets being given also three times a day by mouth. This was followed by a rise in temperature to 38·35° C. (101° F.). However, the "Prontosil" was continued, and on December 20, 1937, the temperature was 37·47° C. (99·4° F.). The face was still swollen.

On December 21, 1937, on Dr. Taylor's suggestion, injections of 0·1 cubic centimetre of staphylococcus toxoid were commenced, in addition to the other treatment. On December 24, 1937, 0·2 cubic centimetre of toxoid was given, and on December 27, 1937, 0·4 cubic centimetre of toxoid was given; this was followed within about half an hour by a severe syncopal attack, from which, however, the patient recovered. All injections were stopped, and administration of digitalis was commenced. The pulse remained rapid, but there was no pyrexia. Cod liver oil was used in the nose. From now on the pain was easier, and, on the advice of Dr. H. V. Foxton, tampons of 10% ichthyol in glycerine were inserted in the nose three times a day, after removal of the crusts when necessary. The patient suffered from severe diarrhœa for several days.

On January 10, 1938, a blood count revealed that the hæmoglobin value was 58%, the colour index was 0·7, the erythrocytes numbered 3,790,000, and the leucocytes 6,900 per cubic millimetre of blood. A differential count of the leucocytes showed that 55% were neutrophile cells, 42% were lymphocytes and 3% were eosinophile cells. Hypochromia and anisocytosis were present, and the platelets were abundant. Dr. A. Murphy prescribed "Fersolate" tablets (Glaxo). On January 15, 1938, mild erysipelas of the left ear was treated with ichthyol and glycerine. Steady improvement took place from now on, but the patient was very weak and had lost much weight.

On February 8, 1938, a blood count revealed that the hæmoglobin value was 81%, and the colour index 0·9. The erythrocytes numbered 4,480,000 and the leucocytes 9,400 per cubic millimetre of blood. A differential count of the leucocytes revealed that 64% were neutrophile cells and 36% lymphocytes. Some anisocytosis and polychromasia were present, and the platelets were normal.

On February 16, 1938, the patient left hospital. The nasal mucosa was practically normal, with very dense synechia between the right inferior turbinate bone and the septum, consequent upon ulceration.

Discussion.

I can diagnose this case only as a case of *herpes zoster* affecting the nasal mucosa. It was of long duration and was accompanied by severe pain, and the patient appeared to be very ill. Although it was a staphylococcal infection it was thought that "Prontosil" should be tried, and this was the only occasion on which any pyrexia of note was observed. Undoubtedly after the syncopal attack which followed the last injection of staphylococcal toxoid and the administration of "Prontosil" the patient began to improve slowly. The most satisfactory local treatment appeared to be the tamponage with ichthyol and glycerine. It is to be noted that in the presence of the severe infection of the nasal mucosa, causing for a long time complete nasal obstruction, the accessory sinuses appeared to escape infection. This, however, is consistent with the observation made in many cases of definite infection in the nose, as from a foreign body, or in cases in which a maxillary antrum is pouring into the nose pus arising from some dental infection of the antrum, that other sinuses so often escape infection. This suggests that the cause of the so common accessory nasal sinus disease is something other than a primary infection.

LYMPHOGRANULOMA INGUINALE (LYMPHOPATHIA VENEREUM).

By EVA A. SHIPTON and T. GORDON ROSS,
Sydney.

LYMPHOGRANULOMA INGUINALE is rarely diagnosed in Sydney. The case reported here is of interest as the patient had never been away from Sydney and the suburbs, there was a history of possible infection and the pathological examinations are complete.

Case History.

G.D., a male, aged twenty-three years, was admitted to the Hornsby and District Hospital on September 14, 1937, complaining of a lump in the left groin which, he said, had started about two weeks previously. Two days prior to his admission to hospital the lump had become slightly painful. On examination a mass was seen in the left groin, about the size of a hen's egg, slightly tender and red over an area 1·25 centimetres (half an inch) in diameter. No source of infection could be found in the left limb or perineum; a few faint reddish spots were seen on the left side of the prepuce, which, he said, had been there for about two weeks before the lump appeared. There was no enlargement of the glands in the right groin, axilla, neck or abdomen. The patient gave a history of possible venereal infection.

The temperature was normal on his admission to hospital, but on the next day it rose to 38·13° C. (100·6° F.). On September 16, 1937, an incision was made in the red area and a few drops of pus were withdrawn. This was not examined. There was very little subsequent drainage, but the temperature continued to vary between 37·25° C. (99° F.) and 38·79° C. (101·8° F.) until September 24, 1937. On this date the patient developed a small sore on each hand, with enlarged glands in both axillæ. Cultures made from the sores showed *Staphylococcus aureus* in pure culture. A blood count on this date gave the following result. The erythrocytes numbered 4,600,000 per cubic millimetre, the hæmoglobin value was 13·1 grammes *per centum*. The erythrocytes were normal. Leucocytes numbered 8,000 per cubic millimetre, of which 55% were neutrophile cells (40 mature and 15 band forms), 35% were lymphocytes, 3% were monocytes, and 7% were eosinophile cells. Toxic changes were apparent in the cytoplasm of some of the neutrophile cells. An X ray examination of the chest revealed no enlargement of the glands and slight evidence of bronchitis.

On October 21, 1937, the lump in the left groin was the same size, and an enlarged gland was felt in the left side of the pelvis and one in the abdomen about the level of the umbilicus. The incision had healed slowly, and another red tender spot had appeared in the left groin about 5·0 centimetres (two inches) away from the first. The glands in the right groin were now slightly enlarged. An incision in the left groin produced a few drops of pus, which was sterile when culture was attempted and contained no tubercle bacilli. A Wassermann test of the blood gave no reaction. A Mantoux test with old tuberculin (1 in 1,000) gave a faint positive reaction.

On November 3, 1937, the glands in the right groin were removed for pathological examination. On November 20, 1937, a leucocyte count gave the following result. The total leucocytes were 8,000 per cubic millimetre, of which 60% were neutrophile cells (27 mature, 33 band forms), 31% were lymphocytes, 5% were monocytes, 3% were eosinophile cells, and 1% were basophile cells. Toxic changes were seen in the cytoplasm of many of the neutrophile cells.

On November 26, 1937, the mass in the left groin was removed. The upper and outer portion was firmly adherent to the inguinal ligament and the *fascia lata*, and had the appearance of being chronically inflamed. The lower inner part contained some discrete glands with smooth outline attached loosely to each other, one of them extending up the inguinal canal.

On December 9, 1937, a Frei test was performed, which gave a strongly positive reaction. The following measurements were made. Twenty-four hours after the intradermal injection the diameter of the central papule was 0·5 centimetre. The diameter of the red areola was 2·5 centimetres. After forty-eight hours the central papule measured 1·0 centimetre and the red areola 4·0 centimetres. This stayed constant for several days, and after nine days the central papule was still distinguishable. The control disappeared after twenty-four hours.

Although the patient did not complain of headaches or dizziness in the early stages, at the beginning of December he began to complain of dizziness and inability to stand the glare of sunlight.

Histopathology of the Excised Glands.

Microscopically, paraffin sections of the excised glands showed changes resembling those found in granulomatous conditions. The normal architecture of the gland had disappeared, and there were numerous small necrotic areas resembling those seen in tuberculosis, but with more neutrophile cells present than are usually seen in this condition. In some fields, epithelioid cells, a few plasma cells and lymphocytes were seen, but no giant cells were found in any of the sections. A prominent feature of the sections was new blood vessel formation, but the vessels did not show any obliterative enderitis. The capsule of the lymph nodes was thickened.

This histological picture is consistent with *lymphogranuloma inguinale*.

Discussion.

The varied terminology applied to this disease, *lymphogranuloma inguinale* or climatic bubo, has caused much confusion, and the American Medical Association has recently adopted the term *lymphogranuloma venereum*,[1] first used by Wolf and Sulzberger;[2] a term which, if brought into universal use, would embrace the various other manifestations of the disease, as *elephantiasis vulvæ*, stricture of the rectum and the genito-ano-rectal syndrome (esthiomene) that are now recognized as being due to the same ultra-microscopic virus. Stannus,[3] in his classical monograph published in 1933, has reviewed the literature up to that date and has clearly shown the importance of the disease and its relation to the above-mentioned conditions. Two cases of rectal stricture with positive Frei reactions recently reported by Darling[4] show that this condition does occur in New South Wales; two cases of climatic bubo[5] were reported from Queensland in 1911. Von Haam and D'Aunoy[6] have recently demonstrated the virus in the spinal fluid of patients suffering from *lymphogranuloma inguinale*, proving that dissemination of the virus in the human body does occur.

It is noteworthy that dizziness and sensitivity to light were present in our patient, but the symptoms were not sufficiently severe to warrant lumbar puncture.

David and Loring[7] describe extragenital lesions due to the virus of *lymphogranuloma inguinale*, and suggest that the Frei test should be more frequently used in granulomatous lesions of unknown ætiology. Thompson[8] notes that a moderate leucocytosis develops with the periadenitis, the number varying from 10,000 to 12,000, with an increase in the mononuclear cells; he notes also that eosinophilia is a constant finding. The patient reported here had no leucocytosis, but the eosinophile cells made up 7% of the total leucocytes.

Now that the disease is known to occur in New South Wales and now that supplies of Frei antigen are available, it is possible that cases hitherto undiagnosed will be recognized.

Acknowledgements.

We have to thank Dr. Rutherford Darling for permitting us to use the antigen sent by Dr. Hayes in order to test the cases of rectal stricture.

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Reviews.

A BOOK ON TUBERCULOSIS FOR NURSES.

In the second edition of "A Manual of Tuberculosis", by Dr. E. Ashworth Underwood, a simple yet educative text-book has been produced, dealing with most aspects of tuberculosis with which a nurse or public health worker may be confronted.[1]

The early chapters state in clear language the underlying principles of tuberculous infection, immunity and body reactions to infection, while the early signs and symptoms of the disease and more serious complications are dealt with in detail.

The author, recognizing that the basic principles of sanatorium treatment must be the basis of treatment elsewhere, has fully described sanatorium methods. Although adult tuberculosis is recognized as a fresh infection in adult life, too much importance is placed on infection in childhood, especially that due to bovine origin. Tuberculous infection in adult life creates problems so much more serious that it is regretted that this aspect has not been more fully discussed. Considerable space is given to the discussion of bone lesions, while special treatments are not overlooked.

The final chapters of the book have been extended to include home nursing, disinfection, work at tuberculosis dispensaries, and general administrative measures.

While providing for almost every contingency that may arise in tuberculosis work, the author has been careful to avoid controversial subjects, keeping strictly to well-recognized methods in general use.

The book is what the author intended it to be: a useful text-book which should be of great assistance to nurses and others doing tuberculosis work.

CHEMIOTAXIS IN BONE GROWTH.

The object of A. P. Bertwistle's monograph on chemiotaxis in bone growth is "to describe disruptive chemiotaxis, a new process to medicine, and to lay down a law which, based on histological grounds, will be found to cover the whole field of bone pathology".[2] This would be an ambitious goal at which to aim in some fifty pages of text, even if the presentation were a model of succinctness. The book, however, contains much iteration and quotation. Indeed, one whole chapter is a translation, for which all due acknowledgement is made, from a French text-book of histology.

The book has been written in support of the thesis "that whenever young fibrous tissue, particularly young blood vessels, come into contact with bone or a calcified deposit, new bone formation occurs". The author presents histological and radiological evidence in support of his thesis. On the latter evidence he is particularly well qualified to speak, as it is derived from the third edition of his well-known "Descriptive Atlas of Radiographs". In presenting this evidence the author is on very sure ground. Unfortunately he has allowed himself to stray into less familiar pseudo-biochemical regions in search of an explanation of his observations, and to adduce unsound botanical analogies for it. He has coined the term "disruptive chemiotaxis" for the process which he describes. The absorption of tissue before growing bone can hardly be compared with the disruptive action on soil or rock of the growing roots of a plant, or of other vegetable tissues when they are caused to absorb moisture and to swell. The growing root tip, for example, follows the nutrient medium of the soil along paths of least resistance. Any disruption which they bring about is mainly due to pressure exerted by the lateral growth of structures which find themselves in restricted space. The question which the author discusses is of great importance. It seems a pity that he did not limit his discussion to the class of observation in which his reputation is so well established.

TROPICAL SANITATION.

"A Manual of Practical Tropical Sanitation", by J. Balfour Kirk, is designed to supply the needs of the tropical sanitary inspector.[1] Those who have read the author's "Public Health Practice in the Tropics" will not be disappointed in this companion volume.

In his preface the author mentions that there is no moderately priced book in English for the tropical sanitary inspector, and hopes that the work will also prove of value to managers of plantations, missionaries and others whose work of an administrative character necessitates their caring for the well-being of native labour forces.

The work commences with two chapters on elementary physiology and anatomy. These are followed by six chapters on diseases both tropical and non-tropical, and on methods available for their prevention and control. The remaining twelve chapters deal with problems of hygiene and sanitation. An excellent index is provided. As might be anticipated, the work is dogmatic; but this is essential if the information given has to be compressed, as has been done into three hundred pages.

The book admirably fulfils the objective of the author.

APPENDICITIS.

Prefaced by a pleasant introduction from the pen of Sir Arthur Hirst, W. H. Bowen's book on appendicitis commands one's attention as a clinical study.[2] The chapter on ætiology is most interesting. Congenital adhesions, bands, and the presence of kinks are generally discounted as playing any part in the causation of acute appendicitis, which in the author's opinion is due to intrinsic factors, particularly infection from a stercolith combining trauma of pressure with a concentrated bacterial flora. Clinically the absence of fever must not allay doubts as to the presence of other clinical signs. The importance of paraumbilical or transverse abdominal pain passing to the right side is of great importance in differential diagnosis. The author invariably uses a pararectal incision in all acute cases, except during pregnancy, when a muscle-splitting incision will allow adequate exposure. Complications and prognosis form separate chapters. This little book is worth reading as a clinical study.

[1] "A Manual of Tuberculosis for Nurses and Public Health Workers", by W. A. Underwood, M.A., B.Sc., M.D., D.P.H., with an introduction by J. R. Currie, M.A., M.D., F.R.C.P., D.P.H.; Second Edition, revised and enlarged; 1937. Edinburgh: E. and S. Livingstone. Crown 8vo, pp. 433, with illustrations. Price: 8s. 6d. net.

[2] "The Rôle of Chemiotaxis in Bone Growth", by A. P. Bertwistle, M.B., Ch.B., F.R.C.S.; 1937. London: Henry Kimpton. Medium 8vo, pp. 71, with 32 illustrations. Price: 8s. 6d. net.

[1] "A Manual of Practical Tropical Sanitation", by J. Balfour Kirk, M.B., Ch.B., M.R.C.P., D.P.H., D.T.M. and H.; 1937. London: Baillière, Tindall and Cox. Large crown 8vo, pp. 311, with illustrations. Price: 7s. 6d. net.

[2] "Appendicitis: A Clinical Study", by W. H. Bowen, M.S., F.R.C.S.; 1937. London: Cambridge University Press; Melbourne: S. Jaboor. Crown 8vo, pp. 213. Price: 7s. 6d. net.

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MEDICAL EDUCATION IN AUSTRALIA.

The recommendations of the General Medical Council of Great Britain on medical education are promulgated to teaching institutions from time to time to guide them in framing regulations. These recommendations, whilst they deal to a large extent with detail, are concerned more with principles than with practice. The high standards of medical education in Australia are generally recognized. Graduates and teachers, distinguished in learning and research, have established a tradition and spread fame abroad; and general practitioners and specialists alike have kept the practice of the profession on a high plane of public service. The whole aim of the General Medical Council and of the medical profession is to give efficient and faithful service. In return for such service it can be expected that the teaching needs will be continuously under revision. Recent events in Melbourne, however, go to show that the University, through failure of public support, has not been able to fulfil its medical obligations. The recent occupant of the Chair of Anatomy, for lack of secretarial assistance, had not only been obliged to forgo research, but also could not make that individual contact with his students which he regarded as one of the first obligations of a university teacher.

Whilst the various governments of Australia have poured students into the universities, they have shown either a complete disregard for, or lamentable ignorance of, teaching requirements. The administrative authorities of the University of Sydney are confronted with the almost impossible task of providing for the training of doctors for the needs of the State with a laboratory accommodation and staff hardly sufficient for the needs of one-fifth the number of students who are entering the courses. There are nearly three hundred students in the first year of medicine, and several of the other years are overcrowded. There is little possibility of making those personal contacts essential in medical education. The various subjects of the curriculum must be arranged in more or less water-tight compartments; and, as Flexner states, "the student, not perceiving at once the use or bearing of anatomy and physiology, fails to develop interest in them". The function of the teacher is to develop this interest by personal contact; otherwise the student is never working on a secure foundation.

The whole problem requires careful revision. The administrators and teaching staffs of the universities should know that their difficulties are appreciated by their graduates and by the general body of the medical profession. Many suggestions may be offered—limitation of numbers by selection or other means, increased laboratory accommodation, increased teaching staffs, and even the founding of another medical school, with its own staff, under the University of Sydney; but only those associated with a university realize the number of possible arguments for and against any proposal. For example, it can be contended that the limitation of numbers would put a hardship on those who were refused admission, and would be contrary to the

spirit of freedom of education; but, on the other hand, consideration for the public welfare must take precedence over personal matters. Again, what guarantee is there that the present numbers will be maintained?

Our isolation from the scientific world and the distance of the universities from one another are serious handicaps to the spirit of cooperation which is found in smaller countries. In Australia we are thus confronted with two kinds of disability —overcrowding of present schools and their inadequate staffing on the one hand, and scientific isolation of the individual schools on the other. Seldom, if ever, does the teaching staff of one Australian medical school come into such contact with the staff of another that its members know and appreciate the attainments and the work of their *confrères* from another State. It may be that in the distant future the solution will be found in an intelligent development of an Australian university at Canberra, where the pre-medical sciences, together with physiology and anatomy, can be taught, while the medical subjects proper are taught in the larger cities. Such a scheme would bind together the Australian universities, for the students at Canberra would be drawn from the different States; moreover, part of the function of a university at Canberra could be the holding of frequent scientific meetings of teachers in specialized subjects, so that mutual understanding would be the rule rather than the exception.

Current Comment.

THE ALIMENTARY TRACT IN HODGKIN'S DISEASE.

That among the protean manifestations of lymphadenoma there exists a particular type primarily establishing itself in the gastro-intestinal canal, is recalled in an article by E. David Sherman, of Sydney, Nova Scotia.[1] He adds a further two cases to the seventy-three already existing in the literature. *Ante mortem* recognition, as can readily be realized, has proved extremely difficult, and the true state of affairs has usually been obscured until autopsy. Schlagen-Haufer, in 1913, described a patient with lymphogranulomatosis limited solely to the gastro-intestinal tract, without involvement even of the regional lymph glands. He is credited with having drawn attention to this type of Hodgkin's disease. Two main groups exist, however, namely, cases in which the gastro-intestinal tract is exclusively involved, and cases in which the gastro-intestinal lesions are part of a generalized or disseminated disease.

In each type a nodular infiltration of the submucosa occurs; this goes on to form a large protrusion into the bowel or more usually to ulcerate. The ulcers are irregular, with firm, greyish, elevated margins. Intestinal obstruction and intussusception are known to have occurred secondarily. The mesentery and appropriate lymph glands are always involved, and may then form large abdominal masses. Any portion of the gastro-intestinal tract may be involved, but the sites usually selected are the stomach, jejunum and ileum. Dissemination may follow in the spleen, liver, pancreas and peritoneum. Perforation, with death from peritonitis or hæmorrhage, has been observed.

Sherman adds two patients of his own to the literature. The first sufferer was an elderly female, who complained of dyspeptic symptoms, and manifested appearances in the stomach radiogram which were considered characteristic of prepyloric neoplasm. The blood count revealed a mild anæmia with neutrophilia, but no other change of importance. Partial gastrectomy was performed, but the patient gradually failed and died five months later. Examination of the stomach revealed an extensive infiltration with pearly white tissue which extended into the gastro-hepatic omentum and neighbouring mesenteric glands. The liver contained a very few rounded areas of similar tissue, microscopic examination of which showed them to be characteristic of Hodgkin's granulation tissue. Other patients with similar stomach lesions have been reported in the literature, some of whom have lived for more than a year after operation.

Sherman's other patient was a woman, thirty-six years of age, who had had symptoms not unlike those of peptic ulceration for a year before pain appeared in the left lower gradient of the abdomen. This pain was colicky and associated with constipation and abdominal distension. Meanwhile, loss of weight and strength occurred. Anæmia was pronounced. Abdominal distension was apparent, but no masses could be felt, nor were the liver and spleen enlarged. A bismuth meal, twice repeated, showed evidence of irregular constriction and dilatation of the small bowel, with delay in motility. The patient failed suddenly before any surgical intervention took place, and died in coma. At autopsy again only the liver shared the lymphogranulomatous change with the bowel. The jejunum and adjacent small gut were extensively infiltrated by tissue typical of Hodgkin's disease, which had ulcerated freely, spreading chiefly in the submucosa. In addition, large, firm masses distended the root of the mesentery.

[1] *Archives of Internal Medicine*, January, 1938.

From a further analysis of the literature, Sherman states that over 50% of the patients affected were between the ages of forty and sixty. It is obvious that pre-operative diagnosis must depend upon the finding of Hodgkin's disease tissue elsewhere. As such tissue is often absent, early recognition would be largely guesswork. One of four clinical entities are chiefly simulated, namely, gastric ulcer or carcinoma, entero-colitis and bowel obstruction. The ulceration in lymphogranuloma frequently involves the upper part of the gastro-intestinal tract, in contrast to the lesion of tuberculosis, which involves the lower segments. There are no specific radiological appearances. Surgical treatment must be largely palliative, and reliance must be placed chiefly upon the well known extreme sensitivity of lymphadenomatous granulation tissue to the effects of X rays. Confusion must frequently have occurred between leuchæmia and lymphosarcoma. Leuchæmia, particularly the myeloid type, can produce very similar lesions with an even greater tendency to ulcerate. For Hodgkin's disease, like cancer, we are waiting for some kind of prophylactic or curative serotherapy, as general dissemination of the lesions, macroscopic or microscopic, is frequently present by the time the sufferer's disease is recognized.

BLOOD INFECTION DUE TO HÆMOLYTIC STREPTOCOCCI.

A CONSIDERABLE variation appears to be shown by the human subject in the degree of resistance to general blood infections occasioned by a streptococcus of the hæmolytic type. Staphylococcal infections, once the barrier to general and persistent blood invasion is passed, are probably much more dangerous, but the streptococcal septicæmias offer even more hope of relief today on account of the introduction of the sulphanilamide group of drugs. C. S. Keefer, F. J. Ingelfinger and W. W. Spink, who have published a detailed study of 246 cases of the latter, regard bacteriæmia as being "due to a loss of equilibrium between the normal clearing mechanism of the body and the local defence mechanism".[1] They observed, as is usual, that the highest incidence of cases was during the winter and early spring, when hæmolytic streptococcal infections are most prevalent. The age of the patient was also an important factor, the decades during which these infections occurred most frequently being the first, the fourth and the seventh. This age distribution corresponded with the frequency of throat and ear infections, puerperal infections and cellulitis and erysipelas respectively. Young patients with middle ear, mastoid and throat infections showed the highest recovery rate, and it was found that the number of deaths increased noticeably over the age of twenty years. The highest mortality rate was observed in the patients with cellulitis and erysipelas. Only less than one-third of the patients showed metastatic lesions, due, the authors suggest, to the virulence of the organism, with resultant overwhelming general infection. In a number of cases the blood had become sterile, but focal metastases then occurred; the result was sometimes favourable if efficient drainage could be promptly provided, but death occurred in other cases. In general the mortality rate was 72%. The nature of the infecting organisms was also studied; in every case they were streptococci of the hæmolytic type, belonging to the virulent Group A of Lancefield, and all produced fibrinolysin. The authors comment on the importance of this property, which apparently prevents the formation of a fibrinous barrier and thus discourages fixation of organisms at the site of invasion. They also refer to the work of Menkin, who has shown that lymphatic thrombosis does not occur in the infections by hæmolytic streptococci, and that therefore lymphatic spread of the organisms can easily take place. It certainly would appear that these cocci are able to produce substances which favour their growth and spread in tissues and also their capacity to invade the blood stream. Antibodies were demonstrated in the blood of these patients, the titre being considerably higher in the case of those who recovered, but, as has been frequently shown by other workers, antibodies were present also in the blood of those who died. These antibodies are supposed to assist in the clearing of the blood of organisms, and they are, with the help of the other defensive mechanisms of the body, capable of dealing with such an infection, provided the supply of virulent streptococci is not unduly great. A loss of equilibrium between the defence mechanism and the clearing capacity of the blood occurs in severe and fatal infections, and this principle also finds a clear application in infective endocarditis, where, in spite of the feebler pathogenic qualities of the organism concerned, the unceasing supply of bacteria proves too much for the body, despite the presence of antibodies in the blood. It may be asked what is the particular value of blood culture in streptococcal infections, and these authors answer by stating that they have found the procedure of greater use in prognosis than in diagnosis. This would naturally follow, and if the physician or surgeon or obstetrician has the satisfaction of saving a patient acutely ill with what is apparently a streptococcal septicæmia, he need not heed the doubts of the sceptic as to whether the diagnosis was confirmed or not. True, a patient's blood may yield a culture and he may nevertheless recover; but even though no organisms grow in the test tube it is wise in threatening cases to act as if a proven septicæmia existed, realizing that it is these patients who have the best chance of recovery, but that such chances may vanish if prompt action is not taken.

[1] *Archives of Internal Medicine*, December, 1937.

Abstracts from Current Medical Literature.

PHYSIOLOGY.

The Influence of Light Adaptation on Subsequent Dark Adaptation of the Eye.

Human dark adaptation, though described by Aubert in 1865 and first measured by Piper in 1903, is still inadequately understood. Selig Hecht, Charles Haig and Aurin M. Chase (*Journal of General Physiology*, July, 1937) describe in detail the effects of the intensity of light adaptation on the dark adaptation which follows it, and show what bearing this information has on other data of visual function. The early data of Piper seemed to show that dark adaptation was an exclusive function of the rods. Only after the measurements of foveal cone adaptation had been made was the reason for this apparent; cone adaptation is so fast that Piper missed it completely. Kohlrausch emphasized the existence of both cone and rod dark adaptation and showed that the two are to a certain extent sharply separated in time. Following adaptation to ordinarily bright lights, dark adaptation occurs in two parts. The first begins at once; it is rapid and is due to cone function. The second part shows up somewhat later; it is slow and is due to rod function. Under these circumstances cone adaptation is over in three or four minutes, whereas rod adaptation takes at least thirty minutes. Five special points in the experiments recorded in this paper were as follows. First, the eye was light adapted with the observer in place so that measurements of dark adaptation could begin immediately. Second, the optical system used gave a constant pupil size without the inconvenience of an artificial pupil. Third, violet light was used for measurement to secure the largest range of rod adaptation; and red light to secure the smallest. Fourth, each exposure to the measuring light was a flash of 0·2 second. Fifth, the measurements represented not quite the threshold of vision, but a brightness about three times as high. The measurements were made with the right eye only, the three authors serving as observers. They found that the course of dark adaptation of the human eye varied with the intensity used for the light adaptation which preceded it. Pre-adaptation to intensities below 200 photons was followed only by rod adaptation, while pre-adaptation to intensities above 4,000 photons was followed first by cone adaptation and then by rod adaptation. (A photon is the retinal illumination produced when the eye looks through a one square millimetre pupil at a surface whose brightness is $\pi/_{10}$ millilamberts.) With increasing intensities of pre-adaptation, cone dark adaptation remained essentially the same in form, but covered an increasing range of threshold intensities. Rod dark adaptation appeared in two types, a rapid and a delayed. The rapid rod dark adaptation was evident after pre-adaptation to low intensities corresponding to those usually associated with rod function. The delayed rod dark adaptation was evident only after pre-adaptation to intensities which were hundreds of times higher than those which produce the maximal function of the rods in flicker, intensity discrimination and visual acuity. The delayed form remained essentially constant in shape following different intensities of pre-adaptation. However, its time of appearance increased with the pre-adaptation intensity; after the highest pre-adaptation, it appeared only after twelve to thirteen minutes in the dark. The authors comment that these two modes of rod dark adaptation are probably the expression of two methods of formation of visual purple in the rods after its bleaching by the pre-adaptation lights. Dark adaptation has usually been considered a fairly variable property of vision. The authors state that in their experience of over ten years they have found that most of the variations in the data arise from the failure to specify conditions of measurement. But even under specified conditions there is a slight day-to-day variation even in a single experienced investigator. It has been known for some time that visual purple in the retina may be regenerated by two methods after being bleached; from the products of decomposition and *de novo*. Wald has been able to identify components of this visual cycle as vitamin *A* and a carotenoid, retinene, and has shown that retinene is the first product of bleaching in the retina and becomes converted later into vitamin *A*. The authors of this paper have recently been able to regenerate visual purple in solution from the products of its bleaching by light.

Relationship between the Blood Sugar Level and the Rate of Sugar Utilization.

Samuel Soskin and R. Levine (*American Journal of Physiology*, November, 1937) have investigated the rate of sugar utilization of normal and depancreatized dogs over a large range of blood sugar levels. In their experiments the utilization of sugar was calculated from blood sugar, blood lactic acid and muscle glycogen values obtained after removal of the liver and intestinal tract and ligation of the ureters. All operations and the subsequent experimental procedures were performed under "Nembutal" anæsthesia. The experiments showed that the completely depancreatized dog, in the absence of insulin, could utilize dextrose at any rate of which the normal animal was capable. They found that in both the normal and the depancreatized dog the rate of dextrose utilization depended upon the height of the blood sugar level. Within a certain glycæmic range the depancreatized dog utilized less sugar at any given blood sugar level than the normal animal at the same level. But their experiments also showed that the depancreatized dog at its usual hyperglycæmic level utilized as much or more sugar than the normal dog at its usual normal blood sugar level. The authors conclude that on the above basis the two supposedly opposing theories of diabetes may be reconciled. The non-utilization theory applies only in a particular restricted sense. The over-production theory remains as the major component of the new conception.

Thyreotropic Hormone, Iodine and the Function of the Thyreoid Gland.

Evelyn M. Anderson and Herbert M. Evans (*American Journal of Physiology*, November, 1937) observe that the use of iodine as a palliative in the pre-operative treatment of Graves's disease seems to rest at the present time upon an empirical basis. In an attempt to assay the potency of solutions of thyreotropic hormone by measuring their effect upon the oxygen consumption of hypophysectomized rats, these authors found that marked hyperplasia of the thyreoid gland was produced after three daily injections of thyreotropic hormone without affecting the oxygen consumption of the animals. A search for the explanation of these unexpected findings led to an investigation of the iodine content of the rats' diet. In this study male rats were used which had been reared in the laboratory and fed on a diet consisting of whole wheat 67%, fish oil 5%, casein 5%, alfalfa meal 10%, fish meal 10%, and salt mixture 3%. This diet was found to contain 35 microgrammes of iodine per 100 grammes, and one-fifth of this amount of iodine in the diet is said to be adequate for the maintenance of a normal functioning thyreoid in the rat. The possibility then suggested itself that the abundance of iodine in the diet prevented the release of the thyreoid hormone, but did not prevent the usual cellular proliferation of the thyreoid produced by thyreotropic hormone. The effect of small amounts of iodine upon the functional activity of the thyreoid was investigated further. Guinea-pigs raised in the laboratory and fed on a diet of fresh vegetables, mixed meal, milk flakes, salt mixture and cod liver oil, had been found to be responsive to the thyreotropic hormone, both as to rises in the metabolic rate and to cellular proliferation of the thyreoid gland. It was found that when a sufficient dose of potassium iodide (100 γ per day) was given in conjunction with the thyreotropic hormone, the rise in metabolism was significantly less than in the group injected with thyreotropic hormone only. The authors comment that their findings call attention to one of the difficulties encountered when attempting to use a physiological test, such

as the measurement of the oxygen consumption, for assaying the thyreotropic hormone. They add that unless the iodine intake of the test animals is controlled, the change in metabolic rate as an index of thyreotropic activity will be quite unreliable. In these experiments the histological changes produced in the thyreoid by the action of thyreotropic hormone were not so readily influenced by small amounts of iodine as the changes in the physiological activity of the thyreoid.

Ovarian Weight Responses to Menopause Urine Injections.

H. H. TYNDALE AND LOUIS LEVIN (*American Journal of Physiology*, November, 1937) record a series of experiments showing the effects of menopause urine extracts in normal and hypophysectomized immature rats. They found that at certain dose levels the weight of the ovaries was actually greater in hypophysectomized than in normal rats. In a second series of experiments thyroxin was added to the injection of menopause urine extract in an attempt to determine whether this might be due to the inactivation of the thyreoid as a result of hypophysectomy. A single batch of menopause urine extract, kept in the form of a dry powder, was used in both series of experiments. Doses of menopause urine extract which gave marked follicular enlargement and little or no grossly observable luteinization in the immature rat ovary, resulted in the production of much heavier ovaries in hypophysectomized animals than in unoperated controls. With higher dosage which gave luteinization in the normal but not in the hypophysectomized rats, it was found that the ovarian weight response was reversed, the normal ovaries being the heavier. The greater ovarian weight obtained in the hypophysectomized rat during the follicular phase of ovarian development indicated that an inhibitory factor was operative in the normal animal. That this factor could be the greater activity of the thyreoid was evidenced by experiments in which the ovarian follicle stimulation induced by extracts of menopause urine in immature hypophysectomized rats was considerably decreased by the simultaneous injection of thyroxin.

BIOLOGICAL CHEMISTRY.

Absorption and Excretion of Iron.

E. M. WIDDOWSON AND R. A. MCCANCE (*Biochemical Journal*, November, 1937) have conducted iron balance experiments on two men and two women. The subjects maintained balance on an iron-low diet (seven to nine milligrammes of iron per day). Large doses of iron (approximately one gramme of iron per day) were given by mouth. Positive balances were obtained in each case, and after discontinuance of the iron administration and allowance of time for the excretion of unabsorbed iron from the gut, net absorptions of 1·5 to 2·0 grammes of iron were observed. Immediately after absorbing such large amounts of iron the subjects were again found to be in iron balance on low iron intakes. The results are taken to support the contention that the intestine has no power to regulate the amount of iron in the body by varying the amount excreted, and that the intestine normally excretes little or no iron. In one female subject the hæmoglobin value rose from 84% (Haldane) to 101% during the administration of the large doses of iron, and in spite of the retention of five grammes of iron, the hæmoglobin value returned to its original level after administration of iron had ceased.

Toxæmias of Pregnancy.

MAURICE B. STRAUSS (*American Journal of the Medical Sciences*, December, 1937) reports the results of studies on the production of acute exacerbation of toxæmia by the administration of sodium salts to pregnant women with hypoproteinæmia. Sodium (as chloride or bicarbonate) given to ten pregnant women with hypertension and hypoproteinæmia resulted in significant gains in weight, in the occurrence of visible œdema and in rises in the arterial blood pressure in each instance. In five women albuminuria was increased, and in three symptoms of pre-eclampsia appeared. An identical amount of sodium given to eight pregnant women with hypertension but no hypoproteinæmia was without significant effect. The manifestations of toxæmia of pregnancy in the patients studied probably resulted from water retention conditional upon hypoproteinæmia. It was concluded that the administration of sodium to pregnant women with hypoproteinæmia was dangerous and that the bicarbonate was as dangerous as the chloride.

Fat and Lactose Utilization.

E. J. SCHANTZ, C. A. ELVEHJEM AND E. B. HART (*Journal of Biological Chemistry*, January, 1938) report experiments on rats which show that some relationship exists between the presence of fat in the milk and the efficient utilization of the galactose part of the lactose molecule. Apparently the animals were unable to utilize galactose in the absence of fats. On a mineralized whole milk diet rats utilized very efficiently all the milk sugar, but on a mineralized skim-milk diet, sugar was readily detected in the urine after a few days' feeding. The urinary sugar was identified as galactose. As much as 35% of the ingested galactose was recovered in the urine. Butter fat, lard, corn oil, coconut oil, linseed oil, palmitic acid and oleic acid prevented this loss in the urine, while glycerol, or butyric, β-hydroxybutyric, caproic or lactic acid did not prevent the loss. On the skim milk diet the blood sugar rose to 200 milligrammes *per centum* after feeding, while on the whole milk it seldom rose higher than 140 milligrammes *per centum*.

Methionine, an Essential Amino-Acid.

W. ZOMACK, K. S. KEMMERER AND W. C. ROSE (*Journal of Biological Chemistry*, November, 1937) fed rats on diets containing no protein but containing mixtures of highly purified amino-acids. The basal ration contained neither methionine nor cystine. On this ration the rats lost weight rapidly. The addition of cystine was practically without effect. The inclusion of methionine induced just as rapid growth as did cystine *plus* methionine. The data showed that methionine was an indispensable dietary constituent, while cystine was not indispensable and apparently was synthesized by the organism.

Determination of Chloride in Biological Fluids.

J. SENDROY, JUNIOR (*Journal of Biological Chemistry*, September, 1937) describes in three papers a new method for the microdetermination of chloride in biological fluids. The method is based on the reaction $NaCl + AgIO_3 \rightleftarrows AgCl + NaIO_3$. The iodate serves as an accurate measure of the chloride present. Gasometric, titrimetric and colorimetric procedures are given in detail. Except in the colorimetric procedure, the removal of protein from plasma, serum and urine is not required, although protein-free filtrates of serum or whole blood may also be used. The methods are rapid and accurate.

Osteoporosis after Gastrectomy in Puppies.

R. A. BUSSABARGER, SMITH FREEMAN AND A. C. IVY (*American Journal of Physiology*, January, 1938) describe experiments from which they deduce that the stomach is essential for the normal growth and development of the bony skeleton. When the stomach was removed from growing puppies fed on a diet adequate for normal puppies, the bones did not ossify normally. The osteoporosis was so severe that bone deformities and even spontaneous fractures resulted. The bone changes were analogous to those observed clinically in children with cœliac disease without rickets. The authors consider that at least three factors contributed to these effects: the absence of hydrochloric acid, which normally renders the less soluble calcium salts more soluble and assists in the maintenance of an acid reaction in the intestine; the absence of the reservoir function of the stomach, which results in increased speed of intestinal transport of ingesta; and the presence of a postcibal acidosis, which tends to decrease calcium retention.

British Medical Association News.

ANNUAL MEETING.

The annual meeting of the Tasmanian Branch of the British Medical Association was held at Hobart on March 5, 1938, Dr. Alan Pryde, the President, in the chair.

Annual Report of the Council.

The annual report of the council for the year ended December 31, 1937, was read and adopted. The report is as follows.

The Branch council has pleasure in presenting its annual report for the year 1937 as follows.

The membership of the Branch, which was 91 at the beginning of 1937, was 92 at the beginning of 1938. Three new members have been elected, five have been transferred into the Branch, and seven have resumed membership by payment of the overdue subscription within the period of grace, while two have left the State, two have died and ten have lapsed through non-payment of their subscription for 1937, but some of these have paid since the beginning of the year.

Since the last annual meeting ten ordinary and two special meetings of the Branch have been held, the average attendance being 18·8, compared with 16·5 in the previous year.

Papers or addresses have been given by Dr. Fagan, Dr. Whishaw, Dr. Hunter and Dr. Hodgkinson, and clinical notes have been contributed by Dr. T. Butler, Dr. Brettingham Moore, Dr. Whishaw, Dr. Shugg and Dr. Gibson.

Twenty-eight meetings of the Branch council have been held, compared with fifteen in the previous year. The attendance has been as follows:

Dr. Pryde	2	Dr. Hiller[2]	21
Dr. Whishaw	22	Dr. Gibson	22
Dr. Fay	25	Dr. Crowther	25
Dr. Brettingham Moore	16	Dr. T. Giblin	17
Dr. T. Butler	23	Dr. Grove	2
Dr. Short[1]	2	Dr. J. Walch	28

Dr. Short, who was one of the members elected at the last annual meeting, found it necessary to resign from the Branch council in April, as he was unable to attend meetings after that date. Dr. Hiller was appointed by the Branch council to fill the vacancy in its membership.

In April of last year a letter was received from the Director of Public Health, inviting the Branch council to cooperate in drawing up a scheme for supplying medical services in remote country districts. Dr. Brettingham Moore and Dr. T. Butler were appointed to confer with Dr. Carruthers and to supply a tentative scheme for consideration by the Branch.

Much information was obtained concerning medical services in other States and countries, and a conference with representatives of friendly societies was held. Our committee drew up a scheme which they considered suitable for Tasmanian conditions. This was sent to all members of the Branch and their comments were invited. It was discussed at a general meeting of the Branch in July and was agreed to in principle and adopted as the objective of the Branch at that time. In the same month a *questionnaire* dealing with the financial conditions of general practice was sent to members of the Branch. The replies to these questions and several discussions at general meetings provided the Branch council with information necessary to its attempt to decide what would be acceptable financial terms for government medical appointments.

After the return of the Premier from abroad it became clear that the Government's proposals for medical services would not be similar to the scheme approved by the Branch. Feeling that members would be required to make an early and important decision as to the attitude to be adopted by the Branch towards the Government's proposals, the Branch council in September sent an urgent request to Dr. J. G. Hunter to visit Tasmania. Dr. Hunter came to Hobart, where he interviewed members of the Government and representatives of the friendly societies and had many discussions with the Branch council and with members of the Branch. He also visited Geeveston, Huonville, Queenstown, Zeehan, Burnie, Latrobe, Deloraine and Launceston, conferring with members of the Branch at each place, and finally he addressed a general meeting of the Branch at Hobart on October 9. On October 17 a special general meeting was held at Oatlands, when the general principles of the Branch's policy were decided. The Branch council then drew up a statement of the views of the Branch, which was adopted as the basis for negotiations and was sent to all members of the Branch and to the Premier. During November and December further negotiations were conducted with the Premier and with the Director of Public Health, chiefly in reference to the terms of employment of full-time government medical officers. Finally, in January your representatives discussed with the Director the terms decided upon by the Government and reported on them to the Branch council. It was considered that although the terms are not as favourable as those our members wished for, they will provide possible working conditions for the men appointed.

For the purpose of advising the Branch council on any matters concerning public medical services the council has appointed a standing committee on social services, consisting of Dr. T. Butler, Dr. Newell, Dr. Brettingham Moore and Dr. Holman.

The Branch was invited by the Parliamentary Committee on Public Works to submit evidence relative to the proposal to build a new railway station in Argyle Street next to the Hobart Public Hospital. Dr. Fay and Dr. Crowther were appointed for this purpose.

The rules of the Branch have been amended by the inclusion of a new series of rules to regulate the formation of special groups within the Branch. In accordance with these rules the Branch council has given its consent to the formation of an ophthalmological group.

Your Branch council wishes to record its gratitude to Dr. J. G. Hunter for his help and advice; and to the Federal Council for authorizing Dr. Hunter's visit to Tasmania; and to offer its congratulations to Dr. John Fulton on his O.B.E., to Dr. Gregory Sprott for his appointment as Knight of Grace of the Order of Saint John of Jerusalem, and to Dr. Goddard, who is Commander of the same order.

Finally it may be observed that the year has been notable for a number of record figures in the statistical history of the Branch. Our membership is greater than it has ever been before, and so are the average attendance at Branch meetings, the number of council meetings held and the average attendance at council meetings. The total attendances at the council meetings were 206 this year, while the previous record was 133 in 1929.

The Northern Division.

The following report of the activities of the Northern Division of the Branch was presented.

The following were the office-bearers for the year 1937: *Chairman*, Dr. W. P. Holman; *Vice-Chairman*, Dr. C. Craig; *Honorary Treasurer*, Dr. C. G. Thompson; *Honorary Auditor*, Dr. G. T. Harris; *Honorary Secretary*, Dr. J. L. Grove; *Executive Committee*, Dr. G. E. Clemons, Dr. J. Ramsay, Dr. J. A. Newell.

Meetings.—Thirteen meetings were held during the year, including the annual meeting and two special meetings. The average attendance was 14·2 (13·3). At six of these meetings clinical material was discussed and papers were presented.

Owing to a number of important medico-political questions presenting themselves during the year, the amount of clinical material presented was unfortunately of necessity limited.

[1] Resigned in April. [2] Appointed in April.

Several meetings were devoted to the discussion of country medical services, and a debate was held on the question of nationalization of medical services.

Considerable discussion was given to a schedule of fees for treatment of injured workers under the *Workers' Compensation Act*.

Annual Post-Graduate Course.—The annual post-graduate course was held from November 27 to 30 inclusive. The lecturers this year were Dr. Byron Stanton, Mr. Leo Doyle and Dr. F. Kingsley Norris, of Melbourne.

The Division extends its thanks to the Department of Public Health for the practical cooperation extended in connexion with the course this year. The department bore the expense of the visit of Dr. Norris, and invitations to the lectures given by him were sent to all medical practitioners in Tasmania.

The following programme was carried out:

Dr. Byron Stanton: "Some Common Problems in Everyday Prescribing", "Physiological Functions and Therapeutic Applications of the Female Sex Hormones", "Some Synthetics that Have Come to Stay", "Pharmacological Oddments".

Mr. Leo Doyle: "Water Balance", "The Choice of an Anæsthetic", "Spinal Anæsthesia", "Local Anæsthesia".

Dr. F. Kingsley Norris: "The Diagnosis of Acute Anterior Poliomyelitis", "Experiences in the Melbourne Epidemic", "The Treatment of Poliomyelitis".

Clinical demonstrations were given by Dr. Norris, and Mr. Doyle demonstrated the use of spinal and local infiltration anæsthesia. The series of lectures was found most helpful and instructive by those who attended the course. The attendance of a large number of members from the country districts was greatly appreciated and added to the success of the course.

The third annual dinner was held at the Launceston Club on Saturday, November 27, 1937. The function proved even more successful than in the previous year.

Library.—Subscriptions to journals have been continued, and binding has been carried out as required. No new books of reference have been added.

Museum Subcommittee.—Owing to the fact that routine *post mortem* examinations are still unobtainable at the Public Hospital, this committee has again been forced into inactivity.

Financial Statement.

The Honorary Treasurer's balance sheet was read and adopted.

Election of Office-Bearers.

The following were elected as office-bearers of the Branch for the ensuing year:

President-Elect: Dr. W. P. Holman.

Vice-President: Dr. J. A. Newell.

Members of Council: Dr. C. Craig, Dr. B. Hiller, Dr. F. W. Fay.

Honorary Treasurer: Dr. Thomas Giblin.

Honorary Secretary: Dr. J. H. B. Walch.

Messrs. Adams, Son and Bennetto were elected auditors.

Induction of President.

Dr. Alan Pryde inducted Dr. Ralph Whishaw as President for the ensuing year.

President's Address.

Dr. Alan Pryde then read his President's address (see page 683).

SCIENTIFIC.

A MEETING of the Queensland Branch of the British Medical Association was held on February 4, 1938, at Brisbane.

Maternity and Some of its Problems.

DR. H. S. MCLELLAND read a paper entitled "Maternity and Some of its Problems" (see page 687).

DR. P. A. EARNSHAW read a paper on the influence of the mother's diet on her baby, which he had written at the request of Dr. McLelland as an addendum to the latter's paper. He began by saying that in the realm of both animal and human nutrition there had been surprisingly little investigation into the influence of an unsatisfactory maternal diet on the offspring. It was reasonable to suppose that defective feeding of the mother must have some influence on her young. It was known that in the animal kingdom the maternal milk supply suffered in times of drought both in quantity and in quality, with dire results to the offspring; the same happened to the human offspring during famine and periods of enemy invasion.

The adult was expected to suffer in proportion to the defect in his diet. This was not so with the offspring, for Nature saw that before the offspring was allowed to suffer the maternal reserves were used up and if necessary the maternal tissues depleted. A defective maternal diet might be quantitatively deficient and the baby might starve from insufficient nourishment. This was very seldom so in Queensland. Dr. Earnshaw said that he had witnessed this only on rare occasions, and then in children of alcoholic mothers. When, for other reasons, the milk supply was insufficient, the mother had resort to complementary feeding for her baby.

The commonest defects in a maternal diet would be expected to be in its principal vitamin and mineral content, in other words, in its content of the vitamins *A*, *B*, *C* and *D*, and of the mineral substances calcium, phosphate and iron.

The classical signs of vitamin *A* deficiency in Queensland infants were very rare indeed, but doubtless subclinical conditions might exist and manifest themselves merely in some degree of lack of vitality *et cetera*. It was well known that rickets was less frequently met with in breast-fed than in bottle-fed infants, and that breast-fed infants whose mothers were badly fed were more liable to rickets than those whose mothers were properly fed. If rickets was regarded as a disease resulting from vitamin *D* deficiency alone, Dr. Earnshaw thought it must be uncommon in Queensland, a State peopled by a white-skinned race with an abundance of sunshine, and where the domestic animals were not stalled in winter, but were pasture-fed throughout the year.

Scurvy due to vitamin *C* deficiency was unknown in breast-fed infants, though no doubt subclinical cases of vitamin *C* deficiency might go unrecognized, the general health of the patient being somewhat below normal.

Although in the past it was known that breast milk contained a definite amount of vitamin *B*, its importance was not recognized, and generally speaking vitamins *A*, *C* and *D* were the only ones considered. Recent work had made medical men realize that vitamin *B*, especially the fraction B_1, was probably of great importance to the obstetrician and the pædiatrician. Vitamin B_1 requirements were proportional to metabolism, and therefore larger amounts were needed during pregnancy and childhood. The pregnant woman and nursing mother needed at least 1,000 international units (probably 1,500 units) of vitamin B_1 for optimum well-being. The nursling needed about 200 units of vitamin B_1 a day, and many nursing mothers had not sufficient vitamin B_1 in their food to pass on an adequate supply to their babies. In fact, extremely few mothers had even half the required amount of vitamin B_1 in their diet, so that it was not surprising to find that breast milk contained considerably less vitamin B_1 than cow's milk. One investigator had gone so far as to say that perhaps millions of infant lives might be saved by employing vitamin B_1 as a routine measure, to the extent that orange juice and cod liver oil were used.

Cases of gross deficiency in vitamin B_1 in Queensland infants were not seen, but conditions such as debility, failure to gain weight, constipation and restlessness were common enough, and in some cases might be due to an insufficiency of vitamin B_1 in the maternal diet.

Dr. Earnshaw went on to say that recently the Queensland Nutrition Council had investigated the mineral content of various foods collected in different parts of Queensland. As was to be expected, there were variations in the mineral content compared with standard figures for other countries, but taken on the whole the average mineral content of foods was up to normal. If, therefore, the maternal diet was at fault, it was not due to the food, but to the individual's choice of food. The most important mineral constituents of food were calcium, phosphate and iron. To what extent the infant might suffer from deficiency in these substances it was difficult to say.

Infants whose teeth had begun to decay almost as soon as they had erupted were sometimes seen. The temporary teeth were formed before the baby was born, and it was therefore reasonable to assume that the teeth were fragile because of a defective maternal diet.

A condition of "soft bones" was by no means uncommon in Queensland children. Its commonest manifestations were conditions such as minor degrees of knock-knee, bow-leg, flat-foot and, less frequently, spinal curvature and chest deformity. If the term rickets was restricted to the results of vitamin *D* deficiency, comparatively few such deformities were due to this condition. X ray pictures seldom revealed evidence of rickets, and the question arose whether the condition was the result of a defective diet, first in the case of the mother and later of the child; and if so, what was the defect.

When pastures were poor in phosphorus, Dr. Earnshaw said, the cattle were apt to develop a condition known as "peg-leg". When insufficient phosphate was available in the animal's diet the bones became brittle and fractured easily, the resulting callus forming a lumpy condition of the bone. The tendency in Queensland children was not to a brittle bone, but to a soft bone, and therefore, if the maternal diet was defective in mineral substance, the deficiency was more likely to be in calcium than in phosphate. In many children suffering from soft bones there was definite evidence that the maternal and infant diet left nothing to be desired, nor was there any evidence of a conditioned deficiency disease, as might occur when there was defective absorption from the alimentary canal (as in cœliac disease). This condition of soft bones was often familial and appeared to be congenital, possibly the result of an endocrinal defect.

It was commonly believed that the anæmia which occurred in late infancy was due to insufficiency of iron in the maternal diet. It seemed natural that this should be so. The diet of the majority of mothers contained insufficient iron, and anæmia was one of the commonest diseases of infancy. Investigations with animals proved conclusively that this anæmia in animals was due to a defect in the maternal diet. Even the second and third generations of the offspring of anæmic rats showed signs of anæmia.

Strauss considered that maternal iron deficiency produced a similar condition in the infant. He arrived at this conclusion mainly by analogy with such experimental work in animals, and also because all the infants of some twelve anæmic mothers whom he had investigated, developed anæmia towards the end of their first year of life. However, the results of such animal experiments could not be applied to human beings, Dr. Earnshaw said, for the reason which he would give. At birth the baby's blood contained much more hæmoglobin than did that of the normal adult. The average hæmoglobin percentage of the new-born baby was 145. This high level of hæmoglobin did not vary except in very severe forms of maternal anæmia. The hæmoglobin level of the blood rose or fell according to the oxygen tension, and whether it was the lower oxygen tension of the maternal blood bathing the placenta or of the air on the mountain top, the result was the same—a rise in the hæmoglobin level.

The hæmoglobin level of the infant at birth was raised in two ways. First, there was a polycythæmic state, in that there were 5,500,000 red blood cells per cubic millimetre of blood, and secondly there was an increase in the hæmoglobin content of each red cell to above forty micromicrograms. The low oxygen tension caused not only an increase in the hæmoglobin value but also an increase in the blood volume. At birth the blood volume averaged 14·7% of the total body weight, whereas at nine months of age it was only 10%.

As Dr. Earnshaw had remarked earlier, the high hæmoglobin level at birth was not dependent on the state of the mother's blood or on her diet. Whether the mother was anæmic or not, the hæmoglobin level at birth was the same.

When the infant was born, Dr. Earnshaw went on, the air it breathed had a higher oxygen tension than the maternal blood bathing the placenta. In addition, the lung was a much more efficient respiratory organ than the placenta. There was, therefore, no longer a need for a high hæmoglobin level. The level of hæmoglobin dropped quickly, till by the end of the second month after birth the average hæmoglobin level, instead of being 145%, had fallen to 77·6%. The number of red cells had dropped from 5,500,000 per cubic millimetre to 3,900,000, and the concentration of hæmoglobin in each red cell had fallen from forty to 30 micromicrograms. The iron released by the hæmolysis was carefully stored. It had been estimated that only four milligrammes of iron were lost during this period. From the end of the second month onwards the infant was actually in a positive iron balance of six milligrammes a month, and the hæmoglobin level rose to the average height of 86% in the normal baby. As the hæmoglobin content at birth of the normal full-time baby was at a constant level, and as it was likely that this applied also to the iron content of the other tissues in the body, it was presumed that deficient iron deposits in the liver at birth might be a cause of the anæmia of infancy.

It had been estimated that at birth the blood contained 330 milligrammes of iron, the liver 50 milligrammes, and the other tissues 70 milligrammes, making a total of 450 milligrammes of iron for the body. At nine months of age the total iron content of the normal baby was calculated to average 500 milligrammes. As the amount of iron in the body at birth was 450 milligrammes, the baby had to obtain a further 50 milligrammes of iron from the breast milk during the first nine months. This was easily achieved, as it had been estimated that the iron intake of the baby during the nine months' breast feeding was approximately 240 milligrammes.

From these estimates, Dr. Earnshaw said, it was obvious that the important stores of iron at birth were not in the liver, but in the blood, which was independent of the state of the maternal blood, and that, even if there were deficiencies in the stores of iron in the liver, they could only very slightly affect the hæmoglobin level of the blood of the nine-months-old infant. It had been demonstrated that the iron content of the blood of a baby at birth was independent of that of the mother, except perhaps in the most severe degrees of maternal iron deficiency. It was not surprising, therefore, that in a series of cases investigated by Fullerton, the infants of the eight mothers most anæmic during pregnancy (with a hæmoglobin value of less than 55%) had an average hæmoglobin value at one year of age of less than 4% below the general average for this age. For several reasons Fullerton had serious doubts as to whether even this slight difference had any significance.

Dr. Earnshaw went on to say that it seemed strange that anæmia in the offspring of the lower animals should depend so much on the maternal diet, whereas in the case of the baby it had little to do with the mother's diet. Most of the animal experiments had been performed on rabbits, rats and mice. The human offspring at nine months old weighed two and a half times its birth weight, but rabbits increased their weight sixfold during the almost exclusive milk-feeding period of the first four weeks of life, and rats grew even more rapidly. Furthermore, the relation of total fœtal weight to maternal weight was much higher in the laboratory animal than in the human being. A female rat weighing 250 grammes had on an average a litter of eight or nine young with a total weight of 36 to 45 grammes, giving a fœtal and maternal weight ratio of 1 : 7 to 1·0 : 5·6. In the human the ratio was much less, approximately 1 : 16. Therefore maternal

iron deficiency was much more likely to result in fœtal iron deficiency in rats than in infants, and the liver store of iron at birth could not be of equal importance in human beings and animals.

The question might be asked, what were the causes of this common anæmia of infancy. In the absence of increased loss of iron from the body, iron deficiency did not occur in infants of average birth weight in the early months. In late infancy, however, anæmia was exceedingly common. In Queensland it was quite as common in late infancy as dental caries was in older children. It was by no means rare to find a baby with a hæmoglobin level as low as 35%, and readings of between 50% and 70% were quite common. Dr. Earnshaw said that the usual causes of this anæmia were: (i) low birth weight, (ii) rapid growth, (iii) artificial feeding, and (iv) infective illnesses. If an infant had a low birth weight, its blood volume was small. The blood volume at birth was a definite percentage of the birth weight, about 14·7%. Any diminution of the birth weight, therefore, diminished the amount of blood and consequently the quantity of hæmoglobin (and therefore iron), with which the child was born. This was aggravated by the rapid gains in weight made by the child with the low birth weight. This handicap the child was unable to make up from its natural resources during infancy until it was able to deal with a general diet. Milk was a poor source of iron, but breast milk contained more iron than cow's milk, and the iron in breast milk was more available than that in cow's milk. One investigator concluded that the iron retention in infants fed with breast milk was five times greater than that of infants fed with cow's milk. The breast-fed baby consumed about 240 milligrammes of iron during the nine months of breast feeding.

Infections during infancy tended to cause anæmia. It was not clear how this was brought about. Iron deficiency was probably a factor, as a negative iron balance occurred during periods of infection. The rapid fall in hæmoglobin level suggested that the toxins of infective processes caused also an inhibition of blood formation in infants. The administration of iron during the illness had no effect in raising the hæmoglobin level, nor had it for several weeks afterwards. Thus the common anæmia of late infancy was seldom nutritional, as was generally supposed, but in the main was due to other factors.

Dr. Earnshaw went on to say that premature infants, babies of low birth weight, and twins ought generally to be given iron from the age of three months onwards, for although not anæmic at birth, they frequently became so, on account of their low birth weight and rapid growth. Artificially fed infants ought also to be given iron after the third month, and infants who had been subject to infections should be given iron, from a few weeks after recovery from the illness. The anæmia might be dealt with by dietetic measures, but recovery was slow; iron given medicinally had a much more rapid effect. Iron and ammonium citrate was a suitable form in which to give iron to infants. Dr. Earnshaw had never known an infant which could not tolerate this preparation of iron, though adults sometimes were not able to do so; one to five grains according to the infant's age, in a little expressed breast milk or water, was a suitable dose for these infants.

When anæmia was established, it generally took about three months of medicinal treatment to effect a cure, and it was wise to warn the mother of this to avoid disappointment. In order not to alarm the mother it was necessary to tell her that the colour of the motions would be altered to a dark shade. When the child had teeth, it had sometimes happened that the mother ceased giving the medicine prematurely, owing to a fear that the iron would damage the teeth. Dr. Earnshaw therefore took care to explain that the iron might merely discolour the teeth and that it would never harm them. When giving iron it was necessary not only to raise the hæmoglobin level to normal, but also to continue giving it for some time in order to build up the reserves of iron. Although Dr. Earnshaw had never known the excessive use of iron in infancy to do harm, nevertheless caution was advisable, as excessive dosage with iron in the adult had led to fatalities in other countries.

NOMINATIONS AND ELECTIONS.

THE undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

Dicks, Harold Griffiths, M.B., B.S., 1938 (Univ. Sydney), Sydney Hospital, Sydney.

Post-Graduate Work.

MELBOURNE PERMANENT POST-GRADUATE COMMITTEE.

A COURSE OF INSTRUCTION IN THE MANAGEMENT OF MINOR INJURIES.

THE Melbourne Permanent Post-Graduate Committee announces that a course of instruction in the management of minor injuries, with special reference to industrial injuries, will be held at Melbourne during the four days May 31 to June 3, 1938.

Programme.

Monday, May 30.

Royal Melbourne Hospital.

9.30 a.m.—Registration at the Post-Graduate Office, Royal Melbourne Hospital.

10 a.m. to 5.30 p.m.—Dr. Julian Smith, junior, and Dr. G. R. A. Syme will examine, demonstrate and in some cases treat patients with injuries on their first attendance at the casualty department of the Royal Melbourne Hospital.

10.30 a.m.—Introductory address.

10.40 a.m.—Dr. Allan Hailes: "Wounds".

11.45 a.m.—Dr. C. W. B. Littlejohn: "Injuries to Muscles and Tendons: Sprains".

2 p.m. to 3.30 p.m.—Casualty department.

4 p.m.—Dr. A. E. Coates: "Injuries to the Hand".

Medical Society Hall.

8.15 p.m.—Dr. C. H. Dickson: "*The Workers' Compensation Act*: Certificates".

Tuesday, May 31.

Alfred Hospital.

10 a.m. to 5.30 p.m.—Dr. C. J. O. Brown and Dr. C. A. M. Renou (casualty department).

10.30 a.m.—Dr. J. Kennedy: "Injuries to the Back"

11.45 a.m.—Dr. Fay Maclure: "Fractures of the Foot and Leg".

2 p.m. to 3.30 p.m.—Casualty department. Dr. A. J. Trinca: Ward rounds.

4 p.m.—Dr. H. C. Trumble: Demonstration of plaster technique.

Wednesday, June 1.

Saint Vincent's Hospital.

10 a.m. to 5.30 p.m.—Dr. Kenneth Hadley, Dr. Robert Hadley (casualty department).

10.30 a.m.—Dr. Gordon Shaw: "Prevention of Stiff Joints".

11.45 a.m.—Dr. Charles Osborn: "Injuries to the Face".

2 p.m. to 3.30 p.m.—Casualty department. Dr. K. Hadley: Ward rounds.

4 p.m.—Dr. T. King: "Minor Fractures of the Upper Extremity".

Medical Society Hall.

8.15 p.m.—Dr. Murray Morton: "Medico-Legal Risks in Surgical Practice".

Thursday, June 2.

Royal Melbourne Hospital.

10 a.m. to 5.30 p.m.—Dr. Julian Smith, junior, and Dr. G. R. A. Syme (casualty department).

10.30 a.m.—Dr. Henry Searby: "Injuries to Nerves".

11.45 a.m.—Dr. H. F. Maudsley: "Late Effects of Head Injuries".

2 p.m. to 3.30 p.m.—Casualty department.

4 p.m.—Dr. W. G. D. Upjohn: "Helps and Hindrances to Healing".

Friday, June 3.

Royal Melbourne Hospital.

10.30 a.m.—Dr. John Turner: "Infections of the Hand".

11.45 a.m.—Dr. W. E. A. Hughes-Jones: Ward rounds (sepsis).

2 p.m.—Dr. E. J. S. King: "The Recognition of Internal Injuries".

3.15 p.m.—Dr. E. E. Price: "Injuries to the Shoulder Joint".

(The fee for this course is two guineas, and should be paid before the commencement of the course to the Honorary Treasurer, Melbourne Permanent Post-Graduate Committee, 61, Collins Street, Melbourne, C.1.)

COURSES OF CLINICAL INSTRUCTION FOR THE DEGREE OF DOCTOR OF MEDICINE, PART II.

A series of clinical demonstrations will be given by members of the honorary medical staff of the Royal Melbourne Hospital, extending over twelve weeks, during May, June and July, 1938. The demonstrations will be given in the lecture theatre of the Walter and Eliza Hall Institute, at 4.30 p.m. on Wednesdays and at 11.15 a.m. on Saturdays. The fee for this course will be ten guineas, and should be sent to the Honorary Treasurer, Melbourne Permanent Post-Graduate Committee, 61, Collins Street, Melbourne, C.1.

PSYCHIATRY.

During May, June and July, Dr. J. K. Adey will give a series of weekly demonstrations in psychiatry, at a time arranged by mutual agreement, at the Receiving House, Royal Park. The fee for this course will be three guineas.

COURSES OF CLINICAL INSTRUCTION FOR THE DEGREE OF MASTER OF SURGERY, PART II.

A series of clinical demonstrations will be given by members of the honorary surgical staff of the Alfred Hospital, extending over twelve weeks, during May, June and July, 1938. The demonstrations will be held at 4.30 p.m. on Wednesdays and at 11.15 a.m. on Saturdays, at the Alfred Hospital. The fee for this course will be ten guineas, and should be sent to the Honorary Treasurer, the Melbourne Permanent Post-Graduate Committee, 61, Collins Street, Melbourne, C.1.

Public Health.

POLIOMYELITIS IN NEW SOUTH WALES.

THE following notice is published at the request of the Consultative Council on Infantile Paralysis for New South Wales.

The Consultative Council on Infantile Paralysis has been formed at the request of the Minister for Health to advise him on all matters relating to the treatment and after-care of infantile paralysis patients. The members of the council are: Dr. R. B. Wade (chairman), Dr. E. S. Morris, Dr. Margaret Harper, Dr. Edgar Stephen, Dr. S. W. G. Ratcliff, Dr. J. Hoets, Dr. Wilfred Vickers, Dr. A. E. Machin, Dr. S. Scougall. Dr. Karen Helms has been appointed medical officer and secretary.

The council has recommended and the minister has approved of a scheme which will provide facilities for the treatment of all patients paralysed in the recent epidemic. The council has appointed an after-care committee [Dr. R. B. Wade (chairman), Dr. S. W. G. Ratcliff, Dr. J. Hoets, Dr. S. Scougall and Dr. W. Vickers] to put this scheme into operation.

The committee has arranged for a number of beds in the Royal Alexandra Hospital for Children, the Royal North Shore Hospital and the Prince Henry Hospital to be made available for patients from any part of the State who are badly paralysed and who will need after-care for a long period. The patients will be in the charge of an orthopædic surgeon. Muscle reeducation will be carried out by masseuses specially trained for this work. Provision will be made by cooperation with other organizations and departments for education and vocational training during treatment. The committee proposes to form after-care centres in country districts where the number of paralysed patients and facilities available justify this course. An orthopædic surgeon will visit such country centres periodically, and a masseuse will give muscle reeducation daily. Paralysed patients in country districts, however, are generally distributed in small numbers over a large area. The committee considers that the best method of providing adequate treatment for these is to bring them to a metropolitan hospital where all facilities are available.

The medical officer will visit country districts and will confer with medical practitioners in regard to the treatment of paralysed patients.

The committee will arrange, on the recommendation of a medical practitioner, transport and admission to hospital of any patient paralysed in the recent epidemic.

All communications should be addressed to the Medical Officer and Secretary, Consultative Council on Infantile Paralysis, Department of Health, 52, Bridge Street, Sydney (telephone B06, extension 2694).

MEDICAL BENEFIT UNDER THE NATIONAL HEALTH INSURANCE SCHEME.

THE following statement is published at the request of the Secretary of the Federal Council of the British Medical Association in Australia.

The arrangements for the provision of medical treatment to persons insured under the proposed national health insurance scheme have been discussed by the Federal Treasurer and Commonwealth officers with the Federal Council of the British Medical Association, and agreement has been reached on the following lines:

1. The service to be provided under the national scheme will be provided for insured persons only and not for any dependants of insured persons. The service will be a general practitioner service, excluding treatment in respect of a confinement, treatment of injuries or disease in respect of which the insured person is entitled to benefit under the *Workers' Compensation Acts*, major operations and the administration of an inhalant anæsthetic. Minor operations and the treatment of fractures and dislocations will be included.

2. The payment to be made to insurance doctors for this service will be at the rate of eleven shillings *per annum* for each insured person entitled to medical benefit under the national scheme. Specialist services, major operations and the administration of inhalant anæsthetics are to be paid for by the insured person under conditions to be determined. To meet the special difficulties of country doctors, additional payments will be made by the commission for mileage, to cover both travelling expenses and

time, in respect of each insured person resident in country districts more than three miles from the nearest insurance doctor, on the basis of two shillings per mile, one way, of each mile over three of the distance between the insured person and the nearest doctor. The payments will be based on the actual numbers and distances of the persons on each country doctor's list.

3. The Insurance Commission will be assisted in the administration of medical benefit by a central medical benefit council, for general matters of policy, and by district medical committees, for individual questions of detail, on both of which insurance doctors will have substantial representation.

Any legally qualified medical practitioner will be admitted to the scheme, and none can be removed from the service except after inquiry by a tribunal of two medical practitioners with a legal chairman. Corresponding safeguards will be provided for insurance doctors in respect of minor disputes.

Insured persons will have free choice of doctor among those included in the service.

4. The arrangements agreed provide for consultation with the medical profession in formulating the details of the scheme.

It is estimated that the scheme will cover about 1,850,000 wage-earners.

Further particulars of the proposals relating to medical benefit will be made available at a later stage.

Correspondence.

NATIONAL INSURANCE.

Sir: National insurance has ceased to be a dim cloud on the horizon; every day it is coming nearer and taking more definite shape. The silence of the leaders of medical thought in Australia is very strange. I have listened in vain for any voice raised either in favour or against the proposal. Has the medical profession in Australia, as represented by the Federal Council of the British Medical Association, become entirely inert and incapable of any spontaneous thought or action? Frequently, when I was on the local Branch council, I asked what was the policy of the Federal Council in this matter. Always the reply was evasive. I was told the council was watching the matter closely and that a committee had been formed. It appears now that the policy of the Federal Council was entirely a negative one. It appears that the council took the view that national insurance was inevitable and that the only thing it could do was to make the best terms possible.

I am in no way opposed to an effective form of national insurance. But surely no thinking person can believe that the form of insurance now proposed is an effective one. The scheme is apparently modelled on the English system, and represents nothing more than a huge extension of a cheap and nasty form of contract medical practice. If we must have a national insurance, surely our leaders can suggest something better than this and can put their views before the Federal Government.

But is a national health insurance for Australia necessary or desirable? National insurance is not intended for the benefit of the politician who wishes for a little honour and glory, or for the medical profession, which certainly at the present time needs a little more sympathetic consideration. Its only justification is that it will contribute to the health and the happiness of the people.

Will the scheme now proposed do this? What has the English system done for the people? It has given a sense of security to certain insured persons; it has given employment to a huge army of civil servants and others who administer the scheme; to some extent it has improved the condition of medical practitioners and probably those of the least deserving class. It seems a high price to pay for these dubious benefits. There is no evidence at all to show that it has improved the health or the physical fitness of the people. I doubt if it has closed a single hospital.

No scheme of national insurance is worth considering that is not based on preventive medicine, and that does not give a complete service both of the general practitioner and of the specialist type to the insured and his dependants. The general practitioner represents the art and the specialist the science of medical practice. These two things cannot be divorced either in practice as it is at present or in an efficient form of national health insurance. Surely our leaders can see this and will not approve the half-baked form of insurance it is now sought to foist upon us.

I doubt if Australia is sufficiently advanced or can afford an insurance scheme of the type I suggest. Why not let us defer consideration for the present time and do what we can for the classes most in need of assistance? The people may be divided roughly into three classes: the richer ones, who can afford the best advice; the poorer ones, who are well catered for by our excellent system of public hospitals; and the middle class, which certainly needs some help.

The middle class can be helped by the establishment of intermediate hospitals, subsidized by the Government if need be, where the best attention can be obtained at a reasonable cost both as regards hospital and medical services. The other class, which most feels a sense of insecurity, includes those who live in far-away places. National insurance cannot help them; but we should do everything we can to help the excellent system of Aerial Medical Services that is now being instituted.

Will not the medical profession take a hand and do something before it is too late?

Yours, etc.,

172, North Terrace,
Adelaide,
March 26, 1938.

D. R. W. Cowan.

Proceedings of the Australian Medical Boards.

QUEENSLAND.

The undermentioned have been registered, pursuant to the provisions of *The Medical Acts, 1925 to 1935*, of Queensland, as duly qualified medical practitioners:

Berg, Max, L.R.C.P. and S., 1937 (Edinburgh), L.R.F.P. and S., 1937 (Glasgow), Brisbane.

Britten, David Abbott, M.B., B.S., 1937 (Univ. Sydney), Toowoomba.

Courtney, Geoffrey Charles Palliser, M.B., B.S., 1925 (Univ. Melbourne), Palm Island.

Kenny, John Joseph Martin, M.D., 1937 (Univ. Melbourne), Toowoomba.

Knott, Charles Henry, M.B., 1937 (Univ. Sydney), Cairns.

Musgrave, Leslie Patrick, M.B., 1937 (Univ. Sydney), Caboolture.

Rettalick, Harold Ainsworth, M.B., B.S., 1937 (Univ. Melbourne), Townsville.

Obituary.

WALTER FISHER.

We regret to announce the death of Dr. Walter Fisher, which occurred on April 2, 1938, at Goulburn, New South Wales.

GEORGE WADE.

We regret to announce the death of Dr. George Wade, which occurred on April 4, 1938, at Cygnet, Tasmania.

Books Received.

GROWING UP: THE STORY OF HOW WE BECOME ALIVE, ARE BORN AND GROW UP, by K. de Schweinitz; Second Edition, revised; 1938. Australia: Angus and Robertson Limited. Large crown 8vo, pp. 95, with illustrations. Price: 6s. net.

ELEMENTS OF CHOMOTHERAPY: THE ADMINISTRATION OF ULTRA-VIOLET, INFRA-RED AND LUMINOUS RAYS THROUGH COLOUR FILTERS, by R. D. Howat, L.R.C.P., L.R.C.S., L.R.F.P.S., with a foreword by Sir Henry Gauvain, M.D., M.Chir., F.R.C.S.; 1938. London: The Actinic Press Limited. Demy 8vo, pp. 126, with illustrations. Price: 8s. 6d. net.

THE PATIENT AND THE WEATHER, by W. F. Petersen, M.D., with the assistance of M. E. Milliken, S.M.; Volume IV, Part 3: Organic Disease: Surgical Problems. Michigan: Edwards Brothers Incorporated. Imperial 8vo, pp. 688, with illustrations. Price: $10.00 net.

Diary for the Month.

APR. 19.—New South Wales Branch, B.M.A.: Ethics Committee.
APR. 20.—Western Australian Branch, B.M.A.: Branch.
APR. 21.—New South Wales Branch, B.M.A.: Clinical Meeting.
APR. 22.—Queensland Branch, B.M.A.: Council.
APR. 27.—Victorian Branch, B.M.A.: Council.
APR. 26.—New South Wales Branch, B.M.A.: Medical Politics Committee.
APR. 28.—South Australian Branch, B.M.A.: Branch.
APR. 25.—New South Wales Branch, B.M.A.: Branch.
MAY 3.—New South Wales Branch, B.M.A.: Organization and Science Committee.
MAY 4.—Victorian Branch, B.M.A.: Branch.
MAY 4.—Western Australian Branch, B.M.A.: Council.
MAY 5.—South Australian Branch, B.M.A.: Council.
MAY 6.—Queensland Branch, B.M.A.: Branch.
MAY 10.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
MAY 13.—Queensland Branch, B.M.A.: Council.
MAY 17.—New South Wales Branch, B.M.A.: Ethics Committee.

Medical Appointments.

Dr. A. O. V. Tymms has been appointed a Medical Officer in the Office of the Director-General of Public Health of New South Wales.

* * *

Dr. R. R. Bye has been appointed Junior Medical Officer in the Office of the Director-General of Public Health of New South Wales.

* * *

Dr. C. S. Graham, Dr. J. R. Nimmo and Dr. J. F. Horan have been appointed Medical Inspectors of Seamen, pursuant to the provisions of the *Navigation Act*, 1912-1935.

* * *

Dr. C. S. Graham has been appointed a Quarantine Officer under the provisions of the *Quarantine Act* of 1908-1924.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser", pages xvi-xviii.

AUSTRALIAN AERIAL MEDICAL SERVICES: Medical Officer.
MATER MISERICORDIÆ PUBLIC HOSPITALS, BRISBANE, QUEENSLAND: Honorary Officers.
ROYAL HOBART HOSPITAL, HOBART, TASMANIA: Resident Medical Officer.
SAINT VINCENT'S HOSPITAL, SYDNEY, NEW SOUTH WALES: Honorary Officers.
THE HORNSBY AND DISTRICT HOSPITAL, HORNSBY, NEW SOUTH WALES: Relieving Honorary Assistant Surgeons.
THE PRINCE HENRY HOSPITAL, SYDNEY, NEW SOUTH WALES: Honorary Officers.
VICTORIAN EYE AND EAR HOSPITAL, MELBOURNE, VICTORIA: Resident Surgeons.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCHES.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17.	Brisbane Associate Friendly Societies' Medical Institute. Proserpine District Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
SOUTH AUSTRALIAN: Secretary, 178, North Terrace, Adelaide.	All Lodge appointments in South Australia. All contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 205, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such a notification is received within one month.

SUBSCRIPTION RATES.—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rates are £2 for Australia and £2 5s. abroad *per annum* payable in advance.